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MOTHS OF THE FAMILY ACROLOPHIDAE IN AMERICA NORTH OF MEXICO (MICROLEPIDOPTERA)

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Introduction

The acrolophidae, a family of small to medium moths of predominantly brownish coloration, have no common name and are not of great economic importance in the United States; but the larvae of these moths, sometimes known as "burrowing webworms," attack grasses (including corn), bromeliads, and orchids, usually feeding on the roots. The group has long been in need of a monographic revision.

These insects, presumably limited to the Western Hemisphere, exhibit perhaps a greater affinity toward the Tineidae than toward any other family in North America. The literature referable to the North American segment of this family is not extensive and is largely confined to the original descriptions of genera and species. Accounts of the immature stages of the species are quite rare. Since the appearance of Meyrick's four species in 1919 no new acrolophids have been described from the United States, and the literature has exhibited very little new information of any kind regarding the family.

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As this investigation progressed, it became apparent that not only had few attempts been made to point out the relationships among existing species, but that several entities previously treated as entirely unrelated species were actually very closely related subspecific components of a single complex species, and that other close relationships indicating the presence of small but distinct species groups had apparently passed unnoticed.

It also became apparent that much of the synonymy created by earlier workers was caused by three difficulties: (1) the placing of too much emphasis upon the deceptively variable characters of size and coloration; (2) the failure to utilize the excellent characters furnished by the structures of the head and genitalia; and, (3) the lack of familiarity with previously designated type specimens.

The majority of synonyms referable to the North American Acrolophidae are confined to a relatively small number of species occurring in the eastern United States. These old, widely distributed, and abundant species not only are common in collections but also exhibit considerable variation in size and coloration over their respective geographical ranges.

The present taxonomic framework of the Acrolophidae is based almost exclusively upon the adult males and although this is not the most desirable situation, it will undoubtedly remain the most accessible and practical approach to the classification of this group until considerably more can be learned about the females and various immature stages. Thus, the present revision is likewise based almost entirely upon males, and all of the author's statements describing the structures and relationships exhibited by the various species are referable to the males of those species unless otherwise indicated.

In the majority of collections, the females of most species of Acrolophidae are considerably rarer than the males. The female is unknown in some species and it has been only tentatively associated with the male in others. The females, in common with those of the great majority of families of the Microlepidoptera, possess two sexual openings, one for copulation and one for oviposition.

To the writer's knowledge, no acrolophid has ever been collected in Canada. Nevertheless, a few of our more northern species, such as *morus*, undoubtedly occur at least sparingly in southern Ontario. There is also a noteworthy lack of records of acrolophids from the northwestern portions of the United States. The group becomes progressively more abundant both in species and individuals toward the southern, and especially toward the southwestern, borders of the United States. More species have been reported from Florida than from any of the other eastern States. Many species have been recorded from Texas and a somewhat lesser number from its neighbor, New

Mexico. By far the greatest variety of species has been collected in Arizona, with the majority taken in the southeastern part of that State. The actual center of distribution of the Acrolophidae is probably either Central America or northern South America. The family ranges considerably southward, a number of species having been described from Argentina. Its members also occur on such island groups as the West Indies and the Hawaiian Islands. Several species have been reported to occur on both the mainland and some of these islands. However, there is some question as to whether any two such distantly isolated populations could actually belong to a single species.

When the present revision was begun, the majority of holotypes representing the known North American species of Acrolophidae was about equally divided between the United States National Museum and the British Museum. The latter institution furnished photographs of its type material in sufficient detail to confirm the identity of the species involved. In May 1951 the writer spent nine days at the United States National Museum in order to study firsthand the types there. It was found that 16 of the 28 holotypes at this institution represented valid species, the remaining 12 proving to be synonyms. The writer has been unable to examine the holotypes of 7 species—those of *popeanellus*, *plumifrontellus*, *arcanellus*, *mortipennellus*, *busckellus*, and *agrotipennellus* at the Academy of Natural Sciences in Philadelphia, and of *texanellus* at the Museum of Comparative Zoology—but their identities are reasonably confirmed by information relating to them in the literature. Specimens of the two species, *acanthogonus* and *exaphristus*, regarded here as *incertae sedis*, and of the subspecies, *macrogaster macrogaster*, have not been available to the writer for study.

Of the 22 species and subspecies described as new in this revision, holotypes of 18 have been deposited in the U.S. National Museum. In those four cases where the Museum did not receive the holotype, it was presented with a paratype morphologically equivalent to the holotype in order to make the collection of at least one institution as complete as possible. The many paratypes resulting from this revision have been widely scattered among a number of institutions in the United States. The disposition of these paratypes is noted in the treatment of each new species and subspecies.

The writer wishes to express his indebtedness to Dr. W. V. Balduf, of the Department of Entomology of the University of Illinois, under whose direction this revision was made. He is also most grateful to the following individuals and institutions who have collectively sent on loan the slightly more than 2800 specimens upon which this study was based: R. H. Beamer (University of Kansas, Lawrence); J. C.

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The writer wishes to acknowledge the suggestion of the original problem by the late Messrs. Carl Heinrich and August Busck of the U.S. Department of Agriculture. When the writer eventually visited the U.S. National Museum in spring of 1951 to study type specimens, Dr. J. F. Gates Clarke was most helpful in dissecting a number of the types and in offering valuable suggestions regarding several problems that had arisen during the course of work. Mr. W. H. T. Tams, of the Department of Entomology at the British Museum (Natural History), very kindly sent excellent photographs of the type material of the North American Acrolophidae possessed by that institution. These photographs represented both the pinned specimens and slide preparations of their genitalia. Lastly, the writer expresses his thanks to Dr. E. P. Darlington for tabulating and sending a descriptive list of the pertinent types in the collection of the Academy of Natural Sciences of Philadelphia.

History and Status

The history of the North American segment of the family, Acrolophidae, actually began in Cuba well over one hundred years ago. This group was first recognized as distinct from other tineids by Poey (1832–1833), who diagnosed it in his newly erected genus, *Acrolophus*, the genotype of which was his new Cuban species, *A. vitellus*. At that time Poey also recognized the affinities between his species and the tineid *Pinaris hamiferella*, previously described from Rio de Janeiro by Hübner, and he stated that both species evidently belonged to the same genus. However, he was unable to accept Hübner's genus *Pinaris* on the grounds that the majority of its species, as well as Hübner's diagnosis of the genus itself, did not at all agree with his conception of *Acrolophus*. Eventually, *hamiferella* was transferred from *Pinaris* to *Acrolophus* by Walsingham (1887a, p. 154), whose quotation of the original description unquestionably showed it to be an acrolophid.

Clemens (1859–1860) described the first acrolophids from North America. Although he recognized their distinctness, he was unaware of Poey's previous diagnosis of the group, and he erected a new genus of Tineidae, *Anaphora*, for the reception of his three new species. Like Poey, Clemens felt that a generic ranking was sufficient for this group. Grote (1872) became the next contributor by adding two species to Clemens' genus. Zeller (1873) also described two species of *Anaphora*, although both subsequently proved to be synonyms of Clemens' earlier species. Chambers (1878a) described a single species under *Anaphora*. Grote (1881) described one more species under his new generic name, *Eutheca*, believing it to be a new type of psychid.

In 1882, Walsingham made the first of his numerous contributions to this group when he became the first to apply Poey's generic name *Acrolophus* to a North American species, *A. simulatus*, of Texas. At the same time, he erected a new genus, *Eulepiste*, for a second new Texan acrolophid. Two years later, he erected another new genus, *Pseudoconchylis*, for a species which he erroneously placed in the subfamily Conchylinae of the Tortricidae. In 1887, Walsingham published his "Revision of the Genera *Acrolophus* Poey and *Anaphora* Clemens," the first comprehensive review of the group. In this work, he treated not only a number of old and new foreign genera and species but also practically all the North American genera and species known at that time. Walsingham also erected 6 new North American genera and described 11 new North American species in this paper. Most of the latter species still remain valid. Walsingham felt that the group's then numerous genera, including his own, were at that time distinct, although he admitted that "intermediate forms may probably be

found." He also accorded the group subfamily status within the Tineidae, referring to it as the Anaphorinae without explaining why he gave Clemens' *Anaphora* (1859–1860) priority over Poey's original genus *Acrolophus* (1832–1833).

Beutenmüller (1887–1888) described four species and a varietal form under *Acrolophus*. All but one of these subsequently proved to be synonyms of older species. In 1891 Walsingham, in a paper on the Microlepidoptera of the West Indies, continued the usage of the subfamily name Anaphorinae. In the same year, Smith in his checklist became the first worker to give the group family status as the Anaphoridae. Like his predecessors Smith failed to give any reasons for his particular ranking, and he also perpetuated Walsingham's error in giving *Anaphora* priority over *Acrolophus*. Walsingham (1897), in a revisional study of the West Indian Microlepidoptera, maintained his category, Anaphorinae, and erected a new West Indian genus, *Atopocera*, which was later applied to a North American species by Dyar.

Following a 10-year period which saw little work done on North American acrolophids, Dyar (1900–1903) described eight species and one subspecies under almost as many different generic names of previous authors. He erroneously placed one of these species in *Phalonia*, a genus of the Phaloniidae. In October 1900 Dyar stated his opinion that the group could hardly be recognized as a family, and that its genera should fall in more naturally with those of the Tineidae. It is to be noted that he followed this plan in his list of 1903. However, in November 1900 Dyar used the subfamily ranking in his title, "New Species of Anaphorinae." Holland (1903) followed Dyar's views in listing the various acrolophid genera among those of the Tineidae. Kearfott (1907) described one acrolophid under *Amydria* (now *Myrmecozela*), a closely related genus in the Tineidae. In the same year, Walsingham described his last North American species in this group under *Homonymus*, a genus he had erected in 1887 for the reception of a species from Argentina.

Busck (1907–1912) described as new six North American species. His first was placed under Walsingham's genus, *Neolophus*, erected in 1887, and it was referred to by Busck as an "anaphorid." However, following the description of his second species in 1910, Busck stated:

> I am unable to retain as distinct the several genera erected on the secondary sexual characters of the various forms of palpi in this group. This view is shared by Lord Walsingham and Mr. Durrant, and will be further elaborated in their forthcoming part of Dr. Godman's Biologia Centrali-Americana.

This and all of Busck's subsequent species were described under *Acrolophus*. In May 1912 Busck apparently became the first to use

the family name, Acrolophidae when, following the description of a new species of *Acrolophus*, he stated:

> The various genera, erected in the family Acrolophidae on the secondary sexual characters of the labial palpi can not be maintained.

Busck again used this family name in September 1912 in his title, "Two New Californian Acrolophidae." By this time, it had apparently been decided by Busck, Walsingham, Durrant, and probably by others among their co-workers that the various genera referable to the group should all be combined under the original genus *Acrolophus*, which should in turn be given family rank as Acrolophidae.

A short time later, Meyrick (1913), in a paper describing new species of South American Microlepidoptera, briefly expressed his opinion of the situation by combining the 16 genera of this group known to him under the single genus *Acrolophus* in the following statement (pp. 191–192):

> *Acrolophus*, Poey—I unite under this name *Anaphora* Clem., *Bazira* Walk., *Eddara* Walk., *Urbara* Walk., *Eutheca* Grote, and Walsingham's genera *Atopocera*, *Ankistrophorus*, *Caenogenes*, *Eulepiste*, *Felderia*, *Hypoclopus*, *Neolophus*, *Ortholophus*, *Pilanaphora*, *Pseudanaphora*, and *Thysanoscelis*, all of which are in my judgment based on characters which are in this genus of specific value only, and indeed in part unreliable even for that. I may add that I treat the generic name as feminine, which is permissible, regarding it as a Greek compound adjective of two terminations, that is, with the masculine and feminine forms identical. I regard the uncus as always double, though the two parts are sometimes closely appressed.

It should be noted that *Bazira*, *Eddara*, *Urbara*, *Caenogenes*, *Pilanaphora*, and *Thysanoscelis* were not referable to North American species. Apparently, Meyrick was not aware that the homonymous name *Eutheca* had been replaced by *Sapinella* Kirby in 1892, and that the homonymous name *Ankistrophorus* had been replaced by *Homonymus* Walsingham in 1887. He apparently was also unaware that the genus *Pseudoconchylis* Walsingham was referable to this group instead of to the Tortricidae. Although Meyrick's reasons for uniting these genera were sound, his conception of the uncus was quite arbitrary and certainly faulty. In many species this organ is obviously single with no indication whatsoever that it is formed from two parts either closely appressed or even fused. Lastly, Meyrick's grammatical treatment of the generic name *Acrolophus* is open to considerable question. In his lexicon Woods (1924) treats it as masculine; and in the present revision the name is considered to be masculine and singular.

In 1913 Barnes and McDunnough described three new species under three of Walsingham's old genera. They also adhered to his subfamily Anaphorinae. And in 1914–1915, Walsingham, Durrant, and Busck saw published their "Tineina of Central America" in the "Biologia Centrali-Americana." This represented Walsingham's last major work on the group in question, and, as the title implied,

the material treated was almost exclusively Central American. However, all the decisions regarding the Acrolophidae previously reached by this group of workers were set down in their statements prefatory to the volume. The failure of the old generic characters was discussed at considerable length, and twenty different genera formerly applied to the group were combined into the one large genus *Acrolophus*. The latter along with two salvaged monotypical genera, neither of North American origin, presumably constituted the family, Acrolophidae. These two genera, *Apoclisis* and *Urbara*, are perhaps now also synonyms of *Acrolophus*, leaving the Acrolophidae a monogeneric family. Although Walsingham and his co-workers gave this group family status without justifying that ranking beyond referring to it as "this very distinctly recognisable family," it has since been generally considered as a family, especially by North American workers.

Haimbach (1915) described a single North American species, since found to be a synonym, under Clemens' old genus, *Anaphora*. In 1917, Barnes and McDunnough in their listing of North American Lepidoptera placed all the known species of the group in the genus *Acrolophus*, under the family Acrolophidae. Meyrick (1919) described as new four North American species, placing them under *Acrolophus*. This author continued to recognize the group only as a large genus of the Tineidae. During the many years subsequent to Meyrick's descriptions of 1919 no new North American acrolophids have been described.

Forbes (1923), one of the first workers to diagnose the group with a fairly detailed and accurate discussion of not only adult but also larval and pupal characters, gave it subfamily ranking as the Acrolophinae on an equal status with the Tineinae, in the family Tineidae. However, he stated: "The two subfamilies are not closely related, and could well be treated as families, as they often are." He did not consider the group to be monogeneric for, without elaboration, he said: "Besides *Acrolophus* there are a couple of other well-defined genera." Forbes' general diagnosis, which did not include genital characters, is now somewhat in need of revision.

Eyer (1924), who made a study of the comparative morphology of the male genitalia of primitive Lepidoptera, accorded the group family status as the Acrolophidae, and he apparently became the first worker to diagnose and place the group on the basis of the male genitalia. Although previous workers, notably Walsingham in 1887, had used these organs for the separation of species, and had described and illustrated them, Eyer was the first to use them collectively for comparison with allied groups. From an examination of 9 North American, 1 Panamanian, and 1 Peruvian species of Acrolophidae, he

concluded that their genitalia most closely resembled those of two genera in the Tineidae, *Scardia* and *Amydria* (now *Myrmecozela*). His examination also supported the earlier combination of all the various genera under the original genus *Acrolophus*. As in the case of Forbes' work, Eyer's diagnosis of acrolophid genitalia now needs some revision. In 1926, Eyer published on characters of family and superfamily significance in the male genitalia of Microlepidoptera, and he again gave the group in question family ranking. However, his genital diagnosis of the Acrolophidae, based largely upon the results of his study of 1924, also included two tineid groups, Amydriinae and Scardiinae.

Comstock, in his general textbook, "An Introduction to Entomology" (1924, and subsequent editions published after his death), followed the general trend in considering the group a family. His diagnosis of the Acrolophidae partially followed that of Forbes, with some change and reduction of information. McDunnough (1939), in his check list of North American Microlepidoptera, listed 46 species, 1 form, and 6 synonyms of Acrolophidae, all under the genus *Acrolophus*. He placed this family between the Psychidae and Tineidae in the superfamily Tineoidea. Costa Lima (1945), in his volume on Brazilian Lepidoptera, considered the group a family, but he erroneously attributed the original usage of Acrolophidae as a family name to "Dyar (1901)." Hinton (1950, personal correspondence through Dr. J. F. Gates Clarke), who was formerly at the British Museum (Natural History) and who has done considerable work on Microlepidoptera, regards the acrolophids as no more than a subfamily of the Tineidae.

It is apparent from the foregoing historical review that there is at present some disagreement among lepidopterists as to whether this group should receive family, subfamily, or simply generic ranking. In the more than one hundred years since Poey erected the genus *Acrolophus*, the numerous workers publishing on the group have given it various rankings, but they have usually failed to include any structural characters to justify those rankings. The taxonomy of adult acrolophids is far from perfect and even less is known about the immature stages and the biology of the group in general. Also, the information on most of the related groups is imperfect in varying degrees. At the present time, the subfamily category has been entirely dispensed with in the North American Tineoidea, and it is very doubtful that a future majority of workers would ever return the acrolophids to the generic level. However, no attempt is made here to justify the family ranking, Acrolophidae, except to say that as such it more conveniently fits into the present and widely accepted classification of North American Tineoidea as set forth by McDunnough (1939).

Taxonomic Considerations

For many years, one of the major systematic problems within the Acrolophidae has been the apparent lack of generic characters. The family is fairly large now and eventually, when the many undescribed species existing in Mexico, Central America, and South America have been accounted for, it will undoubtedly embrace some hundreds of species. It is reasonable to assume that such a large assemblage of species should fall naturally into a number of fairly distinct genera. In addition, for the purely practical reasons of preparing keys and separating the species, it is obvious that the worker, for his own convenience, would very much like to subdivide this assemblage of species into a series of smaller and more easily handled groups or genera. Although the writer has kept these facts in mind throughout the course of the present revision, he has not been able to find any positive generic characters in the Acrolophidae. At best, he has been able to show the existence of a number of small but distinct species groups which at present may be regarded as potential genera.

In separating a group of species into a number of genera, any one genus may be based either upon a single character or upon a group of characters. The Acrolophidae show an annoying resistance to both these lines of approach. The compound eye serves as a good example of the difficulties involved in selecting a single character for generic separation: in some species the eye is entirely naked while in others it is densely setose. Between these two extremes are found well-defined gradations of setosity, each exhibited in a consistent manner by one or more species, with the individuals of any one species having exactly the same amount and type of vestiture upon the compound eye. However, it is possible to take from these same species a series of specimens that exhibits a very gradual and subtle transition of the compound eye from complete nakedness to a very heavily setose condition. Thus, at the generic level, this character is intergrading and must be abandoned.

Exactly the same situation occurs with the labial palpi, which on many species are greatly elongated, while on others they are considerably shortened. With the genital structures the worker fares no better. The uncus is strongly bifurcate in some species while it consists of a single, hooklike process in others; likewise, the gnathos is strongly paired in some species and fused in others, but it will exhibit all degrees of transition between these two extremes through a series of specimens properly chosen from a number of different species.

The venation of the wings offers neither specific nor generic characters. In view of the fact that the arrangement of the veins may be quite dissimilar in the right and left wings of a single specimen, any consideration of venation has been abandoned in the present revision.

In selecting a group or combination of characters for generic separation of the Acrolophidae, there is found a singular failure of any one character to reinforce consistently any other character among the acrolophids. For example, elongate labial palpi and setose compound eyes usually may be associated with one another. In general, as the palpi become longer the eyes become more heavily setose, and, conversely, as the palpi become shorter the eyes become more sparsely setose. However, several species exhibit the combination of greatly elongated labial palpi and naked compound eyes, while several others exhibit a combination of shortened palpi and densely setose eyes. Thus, the combination of eye and palpus must be discarded as a generic character.

The same situation exists among the genital organs. Generally, the bifurcate uncus is associated with the paired gnathos, the simple uncus with the fused gnathos, and both organs tend to show a like amount of fusion or separation in any one species. However, at least one species exhibits the combination of a simple uncus and a strongly paired gnathos. Conversely, another species exhibits a bifurcate uncus and a fused gnathos. Thus, the morphological changes of these two organs from species to species are not always in harmony, and the combination of uncus and gnathos fails to afford a means of generic separation. Cephalic and genital structures may likewise be compared without success. The setose compound eye may commonly be associated with a bifurcate uncus and a paired gnathos, and the short labial palpus is most commonly associated with the simple uncus and the fused gnathos, but to each there are notable exceptions. When four or more characters are used in combination in an attempt to make a generic separation the situation simply becomes more complex and muddled.

From these observations it is apparent that at the generic level any single character becomes an intergrading character, and any number of characters in combination, fail to reinforce one another. But, although every possible proposal for separating the Acrolophidae into two or more genera is met with "exceptions to the rule," this situation provides the worker with a wealth of excellent, nonintergrading characters for the separation of the numerous species.

When all of the species of Acrolophidae have finally been diagnosed and placed in proper sequence, natural genera will undoubtedly emerge from such nuclei as the species groups described in this revision, and they will be based upon rather subtle combinations of numerous characters. To diagnose and assign limits to these genera once their specific components have been found and set into place, will be much easier and also much wiser than to set up arbitrary, and probably faulty, generic categories now, in the hope that subsequently dis-

covered species will fall automatically and smoothly into such categories.

Of the 48 species of *Acrolophus* treated in this revision, 27 may be segregated into a total of 11 natural species groups. The members of any one group are morphologically much more similar to one another than they are to the remaining members of the genus. These species groups cannot be correctly construed as being representatives of genera until the many described and undescribed acrolophids occurring in Mexico, Central America, and South America have been thoroughly diagnosed; at present, it is obvious that at best they may be considered potential genera. The groups of related acrolophids occurring in America north of Mexico are:

1. *simulatus-acornus-bicornutus*
2. *popeanellus-klotsi*
3. *arizonellus-luriei*
4. *cressoni-maculifer-crescentellus*
5. *piger-vanduzeei*
6. *kearfotti-pseudohirsutus*
7. *furcatus-punctellus*
8. *macrogaster* (complex)-*baldufi*
9. *persimplex-fervidus-sinclairi* (complex)
10. *davisellus-serratus*
11. *variabilis-seculatus-macrophallus-vauriei*

The remaining 21 species treated here do not show sufficient relationship with any other acrolophids occurring north of Mexico to warrant their inclusion in species groups. Eventually, however, some of these isolated species will undoubtedly go into combination with other species from Mexico, Central America, and South America to form additional species groups. These unrelated or isolated species are:

1. *dorsimaculus*
2. *griseus* (complex)
3. *texanellus*
4. *exaphristus* (position uncertain)
5. *filicicornis*
6. *plumifrontellus*
7. *mortipennellus*
8. *acanthogonus* (position uncertain)
9. *propinquus*
10. *cockerelli*
11. *pyramellus*
12. *laticapitanus* (complex)
13. *arcanellus*
14. *morus*
15. *forbesi*
16. *panamae*
17. *juxtatus*
18. *chiricahuae*
19. *quadrellus*
20. *minor*
21. *parvipalpus*

Of the species treated here 44 are simple and 4 are complex, and these latter may be subdivided into a total of 13 subspecific components as follows:

1. *griseus* (two)
2. *macrogaster* (four)
3. *laticapitanus* (five)
4. *sinclairi* (two)

Characters of the Family and Genus

The genus, *Acrolophus*, based upon a single Cuban specimen, was described in Professor Felipe Poey's "Centurie de lépidoptères de l'île de Cuba." Written in French and Latin, it contains 20 colored plates and is quite rare in library collections. Although the section on *Acrolophus* is dated "July 1832," the actual date of publication of the entire work in Paris was probably sometime in 1833.

The plate accompanying Poey's description of *Acrolophus* and *A. vitellus* contains three figures: the first, an enlargement of the right forewing of the male, is denuded to show a type of neuration in which the "apical vein" is not forked; the second figure, representing in natural size the adult male in dorsal aspect, shows the overall expanse of the wings to be about 20 mm.; the third, an enlargement of the head, thorax, and legs of the male in right lateral aspect, illustrates the elongated and recurved labial palpi.

It should be noted that in his lexicon, Woods (1944) defines the word *Acrolophus* as "a mountain ridge," a considerably different meaning than that given to it by Poey. Poey's description, translated from the French and Latin text, is as follows:

Acrolophus vitellus, Poey

Characters of the Genus

[Latin] No tongue, antennae simple; palpi very long, recurved, extending past the tergum; all segments barbed up to the apex; anal fringes long.

[French] Genus *Acrolophus*, Poey.—Lacking a distinct tongue, antennae simple, palpi very long, lying on the back, with all the segments barbed up to the extremity; long fringe toward the anal angle.

Characters of the Species

[Latin] Wing luteo-fuscous, forewing with small black spots, costa punctated with black.

[Remainder of article from the French] *Acrolophus vitellus*.—Wings of a yellow brown; the forewings covered with small black spots, more distinct on the costa.

Description

See, on the adjoining plate, the male natural size, the same with the large palpi and legs; and a forewing denuded of its scales, in order to show all the veins; the examination of the discoidal cell shows us that there is still a lot to learn in the study of this character, especially in the smallest species. The latter has the prothorax tomentose and the head placed very low toward the breast. The underside is entirely brown.

Observations

On the genus.—The Greek word ἀχρόλοφος signifies *that which carries a plume to the extremity*; I have made use of it in order to show that the palpi are covered with elongated scales up to the extremity; it is in this that they differ from those

of the ordinary tineids, which have the palpi bent back into a horn and ending in a point. The lack of a tongue distinguishes this species from the Noctuidae and the Tortricidae; in the same manner as the shape, the simple antennae, and especially the length of the fringe of the hindwings, separate it from *Bombyx*; it is allied, by this character and by several others, to the family Tineidae, among which I will place it in the methodical table which will be published at the end of this work.

On the species.—The tineid *hamiferella*, Hüb., Zutr. 441–2, evidently belongs to the same genus; I have two other species of them, which are in too bad a state to describe. For Hübner it is the genus *Pinaris*, which I would have willingly adopted if it had been based on the palpi, and not on the colors of the insect: one is able to see by his Catalogue of the known Lepidoptera, that the majority of his *Pinaris* have short palpi of ordinary form.

History

I have only taken this species a single time; from which I conclude that it is rare, at least it is difficult to find it during the day; that is why I have not been able to study its habits. The name *vitellus* has been suggested to me by the position of the head, which resembles that of a menacing bull; if it is permissible to compare an almost imperceptible creature with an animal so corpulent.

July 1832.

Fifty-five years later, Walsingham (1887a, p. 154) transferred the questionable *hamiferella* from *Pinaris* to *Acrolophus*.

It is apparent that the characters of the genus *Acrolophus* as set down by Poey in 1832 certainly do not all hold true for many of the species now considered as belonging to that genus. His six generic characters may be evaluated as follows:

(1) "No tongue." Apparently true for all species.

(2) "Antennae simple." Frequent exceptions to this condition occur among the North American acrolophids, which exhibit a number of markedly different antennal types, including well-developed bipectination.

(3) "Palpi very long." Applicable to somewhat less than half of the North American species.

(4) "Palpi recurved, lying on the back, and extending past the tergum." Not true for the many species having shortened labial palpi.

(5) "Palpi with all the segments barbed up to the apex." Although true, the value of such a character is questionable; the labial palpi are completely clothed with scales in many groups of Lepidoptera.

(6) "Anal fringes long." Also true, but again a character of questionable value; the adjective "long" is subject to a rather wide range of interpretation, and the anal fringes are relatively long in many groups of the Lepidoptera.

Since the family is here considered to consist of but a single genus at present, both the Acrolophidae and *Acrolophus* may be treated as one

in regard to their characterization. The definition of the group, based here only upon those species occurring in America north of Mexico, is necessarily incomplete.

The Acrolophidae constitute one of the more primitive families of the nonaculeate Tineoidea. The species are distinctly frenate, the frenulum of the male being a single, large bristle and that of the female being divided into a number of smaller bristles. The basal segment of the antenna is never enlarged or modified to form an eye-cap. In the males, the basal segment of the labial palpus is relatively very large in comparison to that exhibited by allied families. In the male acrolophids, this segment is normally upcurved to the middle of the front.

Many of the species are large, robust moths resembling noctuids. Others are small, fragile, and somewhat tortricid-like. The wing expanse may range from about 10 mm. in the males of some of the smallest species to about 40 mm. in the females of the largest species. Both of these limits are quite easily exceeded when the many tropical species are taken into consideration. In any one species, the females are noticeably larger than the males. However, in a large series of any one species, the largest male is commonly larger than the smallest female. The coloration in both sexes is predominantly brown. Different shades of this color may be variously combined with smaller amounts of white, yellow, gray, black, and red. The color pattern in any one species is generally quite variable, and the pattern of the female tends to be less distinct or more suffused than that of the male. A few species exhibit a rather marked dimorphism in color between the two sexes.

The head is retracted. The vestiture of the head, labial palpi, and maxillary palpi is rough and very dense, consisting largely of scales and spatulate hair. The ocelli are absent. The compound eyes are medium-sized to rather large and they may be naked to very densely setose in both sexes. In any one species, the eyes of the male and the female exhibit approximately the same amount of vestiture. The antenna has a somewhat globular scape. The antennal shaft is smoothly covered on the dorsal surface with at least two rows of scales to a segment. The lateral and ventral surfaces of the antenna are finely pubescent with sensory hairs commonly overlaid with additional scales. The antennae of the males may be simple to strongly bipectinated, while those of the females are always simple and relatively more slender. The mouthparts are wanting in both sexes, the maxillae being simply fused into a small plate bearing a pair of minute, 2-segmented maxillary palpi. This structure and its palpi are normally covered by the much larger, upcurved labial palpi.

The labial palpi, from which the generic name has been drawn, are large, 3-segmented, and without bristles. In the males, these structures may be elongated and recurved back over the head and the dorsum of the thorax to the extent that they reach the first abdominal segment. In such cases, when the palpus is denuded of its vestiture, the basal segment is never the longest of the three. The labial palpi of the males may also be quite short, in which event the denuded basal segment is always the longest of the three. In some species, this basal segment is as long as, or even longer than, the other two segments combined. Although the palpi of the males are always upcurved, they may or may not be closely appressed to the head and thorax. In any one species, the labial palpi of the female are always shorter than those of the male. However, in those species in which the males have considerably shortened palpi, those of the females are only slightly shorter. In other species, the palpi of the females are much shorter than those of the males. In still other species, the palpi of the females are considerably elongated. The labial palpi of the females may be upcurved, porrect, or drooping, but they are never recurved back over the head and thorax.

The thorax is prominently tufted anteriorly and posteriorly, the vestiture being rough, deep, and very dense like that of the head and palpi. In regard to the legs, the femora are similarly clothed, while the hind tibiae are hairy rather than bristled. Forbes (1923, p. 25, fig. 19) has figured and labeled in detail the neuration of the right wings of a typical male acrolophid, *A. popeanellus*, stressing the fact that vein R_5 of the forewing extends to the outer margin. In this group, the neuration seems to furnish little in the way of generic or specific characters. Comstock (1924, p. 611) briefly described the venation as follows:

> The venation of the wings is quite generalized; the base of media is more or less preserved, and all the branches of the branched veins are present; there are three anal veins in both fore and hind wings; in the fore wings the tip of the third anal vein coalesces with the second anal vein.

The abdomen is thickly covered with spatulate scales. In some species, these scales are rather densely overlaid with elongate hairs. In any one species, the abdomen of the female is longer, thicker, and more distended than that of the male. In the males of some species, secondary sexual characters are exhibited in the form of large tufts of scales or elongate hairs arising from the terminal abdominal segments. Except for the genital segments, the abdomen offers little in the way of generic or specific characters. The female has two genital openings, one for oviposition and one for copulation. The latter is surrounded by a ventral genital plate near the tip of the abdomen. The form of this large, heavily sclerotized plate may be used for the separation

of certain species. Normally, the genitalia of the male are partially extruded from the tip of the abdomen.

The male genitalia are of a primitive type similar to those of the Tineidae. The uncus may terminate in a single process, it may be a strongly bifurcated organ, or it may represent any one of a fairly complete series of transitional forms between these two extreme conditions. Likewise, the incomplete gnathos may be paired or fused, with a series of intermediate forms. The harpes are large and commonly spoon-shaped. The cucullus of the harpe rarely bears a clasper, while the costa bears a large, dorsal process in several species. The transtilla is incomplete, consisting simply of a pair of slender arms attached to the harpes. The aedeagus is rather large and normally somewhat expanded or bulblike at the base. It has a large, eversible vesica which commonly bears one to many cornuti. The anellus is typically membranous and unarmed. Rarely, it is partially sclerotized or furnished with minute, spinelike processes. The juxta is normally absent, although it is present in a rudimentary or reduced form in a few species. The vinculum is a simple, U-shaped pouch serving as a base of attachment for the various genital organs. The major genital structures commonly occurring in other groups of Lepidoptera but lacking in the Acrolophidae are the paired socii, the saccus of the vinculum, the clasper of the harpe, the central bridge of the transtilla, the median ventral plate of the gnathos, and the juxta or medioventral plate of the anellus.

The larva, called the "burrowing web-worm," has been characterized by Forbes (1923, p. 119) as follows:

> Larva with front reaching only halfway to vertex, the adfrontals very wide and reaching vertex; ocelli six, but not regularly arranged, the fourth and lower being much closer together than the second and third are; head ventrally chitinized behind labium. Leg with trochanter one-third as wide as femur; prothoracic legs separated by a distinct, chitinized sternum; thorax with setae on large shields; tubercles iii to v apparently taking the place of pleural sclerites; cervical shield extending the whole width of the prothorax and enclosing the spiracle; prolegs with one complete ellipse of hooks, preceded by several (3–6) rows of rudimentary ones; the anal proleg with a curved band.

The larval habits of several species occurring in Illinois have been described by Comstock (1924, p. 611). His description, partially drawn from the observations of Forbes (1905), is as follows:

> The larvae normally live in the ground feeding on the roots of grass. Each larva makes a tubular web opening at the surface and leading down into a vertical cylindrical burrow about the diameter of a lead-pencil, and six inches to two feet, or even more in depth. The larva measures about 25 mm. in length. Sometimes the larvae injure young corn when planted on sod. They surround the base of each plant with a fine web mixed with earth and pellets, building this up in the lower blades, which they slowly eat away. As they get larger they eat the stripped plant to the ground. When disturbed they retreat into their web-lined burrows.

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Pupation occurs in the larval tube in the soil. Forbes (1923, p. 119) has characterized the pupa as being heavily sclerotized, suited for coming up through the earth, and having the antenna shorter than the bluntly rounded forewing. The eggs are oval and strongly ridged.

The Head

The cephalic structures of the male are deserving of special consideration in view of the fact that they are second only to the male genital organs in furnishing not only good specific characters but also potential generic characters. Although the labial palpi, compound eyes, and antennae are easily observable in pinned specimens, the taxonomic value of the form and vestiture of these structures has been commonly overlooked by previous workers in this family. Only the reduced maxillary palpi apparently fail to offer taxonomic characters below the family level. Identical form and vestiture of the labial palpi, compound eyes, and antennae in either the male or the female are consistently exhibited by all of the individuals in any one species or subspecies. In some cases, these similarities are common to the members of a species group, in which event the cephalic structures assume potential generic value.

THE LABIAL PALPI

The writer has spent considerable time studying the relative lengths of the segments in the denuded labial palpi of the males of the various species of Acrolophidae. The males of the North American species of *Acrolophus* can be morphologically, although probably not phylogenetically, separated into two distinct groups on the basis of the relative segmental lengths of their labial palpi. Approximately one-third of the species have greatly elongated palpi recurving back over the head and extending across much or all of the dorsum of the thorax; in these the basal segment is never the longest of the three segments. The majority of species exhibit palpi which are short or, in some cases, intermediate in length; in these the basal segment is always the longest of the three segments.

In those species having the elongate palpi, the heavy and often plumose vestiture almost invariably obscures not only the points of articulation between the segments but also the apical limits of these organs. Thus, the palpus must be denuded in order to ascertain the relative lengths of its segments. The basal segment is always large and recurved back against a considerable portion of the head. This curvature makes accurate measurement of its length quite difficult and any figures obtained for this segment should at best be considered as approximations. The central and apical segments are rarely linear, commonly sublinear, or occasionally somewhat curved,

depending upon the species involved. However, their lengths may always be obtained with reasonable accuracy.

Several conditions may be established for those species exhibiting elongate labial palpi: first, the segments never become progressively shorter from the basal to the apical; second, the basal segment is never demonstrably the longest of the three segments and typically is somewhat to considerably shorter than the central segment; third, when it is occasionally as long as or rarely longer than the central segment, then it is always somewhat to considerably shorter than the apical segment. Since the basal segment is quite large in all species of *Acrolophus*, it is apparent from the above conditions that those species having the unusually long palpi have attained them through a relatively marked elongation of the central and apical segments.

Also, a variety of combinations of segmental lengths occur among those species having elongate labial palpi. The basal segment may be much shorter than (*mortipennellus*), about as long as (*macrogaster laminicornus*), or much longer than (*dorsimaculus*) the central segment. Likewise, the basal segment may be much shorter than (*plumifrontellus*), about as long as (*propinquus*), or much longer than (*luriei*) the apical segment. Further, the central segment may be much shorter than (*plumifrontellus*), about as long as (*popeanellus*), or much longer than (*arizonellus*) the apical segment. Intermediate ratios occur among these major combinations, and the relative segmental lengths may also vary slightly among the individuals of one species.

The denuded segments of the labial palpi are normally tubular or cylindrical in form. However, in *griseus griseus* the central segment becomes progressively laterally flattened distad, appearing very broad in lateral aspect and very narrow in dorsal aspect, while the apical segment is even more markedly laterally flattened. In several species, the apical portion of the apical segment is very slender and attenuated. Those species having elongate palpi typically have setose compound eyes, although *griseus* and *dorsimaculus* are two notable exceptions.

In those species having labial palpi short or intermediate in length, the vestiture obscures the segmentation less, and in some the segmental lengths may be approximated without removing the scales. The basal segment is again large, but it may or may not be closely appressed to and recurved against the head. The central and apical segments may be linear, sublinear, or somewhat curved.

The short and intermediate types of labial palpi exhibit a simpler and more consistent segmental condition than does the elongate type. The segments invariably become progressively shorter from the basal to the apical. Typically, the basal segment is considerably longer

than the central segment, although rarely it is only slightly longer (*macrophallus*). Its length may be less than, equal to, or greater than the combined lengths of the central and apical segments. The central segment may be slightly to considerably longer than the apical segment. In some species having short palpi, the apical segment is extremely short.

In *arcanellus*, a species exhibiting an intermediate type of palpi in which these organs recurve back over the head and extend partially onto the dorsum of the thorax, the relative lengths of the denuded segments are nine for the basal, seven for the central, and five for the apical. However, with its long scales included, this apical segment has a relative length of approximately ten, illustrating how the elongate terminal vestiture may increase the apparent length of the labial palpi. There is no morphological distinction between the short and the intermediate types of palpi, and some transitional forms occur. However, most species not having elongate palpi fall into the one type or the other, and the types are used here as a matter of convenience. Palpi of intermediate length are to some extent associated with setose compound eyes. Short palpi are normally associated with naked eyes, although there are a number of exceptions.

Among the species of *Acrolophus* the vestiture of the labial palpi ranges from rather sparse to very dense, short to elongate, and fairly smooth to rough or somewhat tufted. The scales themselves vary from very slender and hairlike to very broad and spatulate, with both types commonly occurring in one species. The slender scales are typically simple, while the spatulate scales may have their apices simple, bifid, or trifid. The scales are variously colored, and a single scale may exhibit two or three different colors. In such cases, these colors may blend gradually into one another, or each may be rather sharply limited to a definite portion of the scale.

THE COMPOUND EYES

Unlike the labial palpi and antennae, the compound eyes exhibit almost identical form and vestiture in both the male and female of any one species. The eyes vary from fairly large and prominent (protruding) to medium-sized and partially concealed (retracted). Typically circular, they are somewhat elliptical in some species; and like those of the majority of nocturnal moths, they possess many facets. Many species have lashed eyes, with bristles or lashes, which arise around the edge of the eye and curve over it, and are commonly concentrated along the anterior and posterior margins of the eye, although the entire eye may be surrounded by them. The prominent, anterior tuft of lashes in both sexes of *arcanellus* furnishes an excel-

lent character for the identification of that species. The eyes of some species are quite heavily lashed, while those of others are entirely without lashes.

In many species, minute hairs or setae arise between the facets of the compound eyes. Although these setae may be short or long, they are invariably very slender and delicate; in pinned specimens, they are extremely brittle and may easily be broken off. The setae are normally erect and linear, although they are recurved and recumbent in the *cressoni-maculifer-crescentellus* species group. The compound eye may be very densely setose or entirely naked. It may exhibit any of a number of transitional forms between these two extremes, depending upon the particular species selected for study. The eyes of several species exhibit a very sparse scattering of extremely minute setae. Setose eyes are normally associated with elongate labial palpi, but there are a number of exceptions. As a rule, naked eyes are associated with palpi which are short or intermediate in length. Typically, the setose eye is associated with the bifurcate uncus and the naked eye with the simple or undivided uncus, although there are a number of exceptions in both cases.

THE ANTENNAE

The general structure of the antennae in the Acrolophidae has been described in the foregoing characterization of the group. The simplest type of antenna, exhibited by many species, is that in which the segments are short and robust with a globular or beadlike appearance. A somewhat more complex type, also exhibited by a number of species, is a laminate antenna in which each segment has a ventral, quadrangular extension that appears flattened and platelike in lateral aspect. The most complex type of antenna, occurring in several species, is the bipectinate type in which each segment bears two separate processes that arise independently from the antennal shaft and extend lateroventrad. These processes are quite large and prominent, having a tendency to enlarge toward their apices.

Between these simplest and most complex types of antennae, a number of intermediate or transitional forms occur among the acrolophids. Described in detail in the key and in the sections treating the various species, the major types of these are (1) simple or globose, (2) laterally flattened or laminate, (3) transitional between laminate and unipectinate, (4) reduced unipectinate, (5) strongly unipectinate, (6) showing moderate tendency toward bipectination, (7) reduced bipectinate, and (8) strongly bipectinate.

On the antennae of all species, on the dorsal portion of each segment, are at least two rows of scales that overlap to furnish the antennal

shaft with a continuous covering, and on the antennae of many species is a complete ring of scales encircling each segment; about 90 percent of the smaller North American species of *Acrolophus* have this complete ring of scales on each antennal segment. Segments clothed with scales in this manner are almost invariably of the simple or globose type, although a striking exception is the completely scaled but unipectinate antenna of *A. texanellus*, and in the subspecies *laticapitanus laticapitanus* each antennal segment is furnished with two complete rings of scales. Normally, this complete ring of scales is wanting in the larger species and in those having complex types of antennae; such species commonly have an incomplete ring in which the scales extend partly onto the lateral surfaces of the antenna.

The minute setae or sensory hairs are quite short in the simple forms of antennae, although they tend to become elongated on those segments bearing complex processes such as occur in the unipectinate and bipectinate forms. The form and vestiture of the antennae are consistent throughout the members of the *cressoni-maculifer-crescentellus* species group. Thus, in this case, the antenna assumes potential generic value. Conversely, antennal forms are only of subspecific value in the complex species, *macrogaster* and *sinclairi*.

MALE GENITALIA

Although there is still some disagreement among lepidopterists as to the origins and limits of certain genital structures, especially the tegumen, a rather generally accepted concept of their morphology and homology throughout the different families now exists. Likewise, there has developed a group of terms widely used in the description of these structures.

Pierce, in his pioneering works on British Noctuidae (1909) and British Geometridae (1914), contributed much to the present knowledge of the morphology and terminology of lepidopterous genitalia. Although earlier workers, such as Buchanan-White, Gosse, Smith, and Baker, had described and named some genital parts, Pierce was probably the first to make a really detailed taxonomic study of the entire male genital apparatus of many species and genera of moths. He not only formulated a fairly complete set of names for these structures but also was one of the first workers to stress the great value of the aedeagus and its associated organs for the separation of species. Busck and Heinrich (1921), in their paper on the systematic importance of the male genitalia of Microlepidoptera, drew heavily from Pierce's system of nomenclature and concept of morphology. Subsequently, they applied their somewhat modified system in the description of the genitalia of numerous new species of North American Microlepidoptera. Eyer (1924) published on the comparative

morphology of the male genitalia of the primitive Lepidoptera, basing his system largely upon the works mentioned above, but adding much to the knowledge of the morphology and homology of these structures.

While the present revision introduces no new terms or concepts, it is of some interest to note the author of each term and the date he gave it the approximate morphological definition presently accepted, as follows: Buchanan-White (1876), tegumen; Gosse (1883), uncus; Smith (1890), harpes, clasper (of sacculus of harpe); Baker (1891), saccus; Pierce (1909), vinculum, aedeagus, vesica, cornuti, sacculus of harpe, cucullus of harpe; Pierce (1914), anellus, juxta, manica, costa of harpe, valvula of harpe, costal arm or process (of harpe), transtilla, socii, gnathos; and, Busck and Heinrich (1921), penis. Several of these structures are of importance because of their reduction or complete absence in the Acrolophidae. Although the works of Buchanan-White (1876), Gosse (1883), Smith (1890), and Baker (1891) are not cited in the present revision, reference has been made to these workers by Eyer (1924).

In the following characterization, the concepts of the above workers, especially those of Busck and Heinrich, have been combined, condensed, and modified so as to apply specifically to the North American Acrolophidae. Except for the penis and its associated structures, the parts discussed below are generally considered as belonging to the external genitalia. Only the ninth and tenth abdominal segments are involved in the structure of the external genitalia. The eighth segment does not exhibit any genital modification and the presence of an eleventh segment is not indicated. Although the exact defining limits of the ninth and tenth segments are not determinable, it has been indicated that the sclerotized structures surrounding the genital opening (i.e., the vinculum, anellus, aedeagus, harpe, and transtilla) are developments of sclerites of the ninth segment, while the sclerotized structures surrounding the anal opening (i.e., the uncus and gnathos) are developed from the tenth segment.

The vinculum (VN, fig. 5), a modification of the ninth sternum, is a ventral, sclerotized, U-shaped pouch articulating at its dorsal extremities with the tegumen and serving as a base of attachment for the genital capsule. The saccus, a medioventral anterior projection of the vinculum, is absent.

The anellus (AN, fig. 2) is normally an undifferentiated, unsclerotized, unarmed membrane situated within the ventral angle of the vinculum and supporting the aedeagus which it surrounds in the form of a cone. In a few species, it is partially sclerotized; in several others, it is densely clothed with minute, seta-like processes. The juxta

(JX, fig. 2), the ventral plate of the anellus, is normally absent. It occurs in a reduced or rudimentary form in several species.

The manica (MA, fig. 2) is the eversible, membranous sheath of the aedeagus. In the Acrolophidae, it encloses most of the unopened portion of the aedeagus, articulating with both the aedeagus and the anellus. Since the manica is unsclerotized, unarmed, and rather obscure in the members of this family, it offers no character of taxonomic value and it is not mentioned elsewhere in this revision.

The aedeagus (AD, figs. 2, 6) is a sclerotized tube supported by the membrane (anellus) of the ninth segment. Its base is normally somewhat expanded or bulblike, and it may be simple or prolonged into one or more spinelike processes at the apex. It may be glabrous or armed with toothlike projections or spines. This rigid cylinder serves as a protective armature and guide for the membranous penis (PN, figs. 2, 6), an internal genital structure. Although the penis lies within and for part of its length is connected with the aedeagus, this soft and flexible tube can be projected by blood pressure far beyond the mouth of the aedeagus itself. This eversible portion of the penis is called the vesica (VS, figs. 2, 6), and it serves to introduce the sperms into the bursa copulatrix of the female. It is commonly armed with one to a variety of spines, the cornuti (CN, figs. 2, 6), whose relative constancy of size, shape, and number within each species is of great taxonomic value for the separation of species.

The harpes (fig. 1 and HP in figs. 5–6) are paired, lateral, clasping organs attached to the vinculum and articulated with the anellus. These symmetrical, flattened, roughly spoon-shaped structures are subject to considerable modification of form among the various species, thus furnishing very good specific taxonomic characters. The harpe can be roughly differentiated into three areas: a dorsal or costal area, the costa (CS, fig. 1); a ventral area, the sacculus (SC, fig. 1); and, an apical area, the cucullus (CU, fig. 1) or valvula. Normally, these are simply defined by areas of heavier sclerotization, inward foldings, and the location of setae (PS, figs. 1, 5). Any one of these major areas may be developed at the expense of the others. Rarely, the costa is developed into a free extended arm, the costal arm or costal process (CP, fig. 1), forming a double harpe structure. The sacculus is never developed into a clasper. However, a clasper (CL, fig. 1) does occur rarely on the inner surface of the cucullus.

The transtilla (TR, fig. 1) is reduced, broken in the middle, and occurs as a pair of free, glabrous, well sclerotized arms suspended from the inner costal angles of the harpes. These arms, which are somewhat variable within any one species, are not of much taxonomic value in separating the species.

The uncus (UN, figs. 3–6) is the posterior, dorsal projection of the genitalia above the anal opening. It is heavily sclerotized, normally hooklike, and it may be naked or setose. It may be simple, terminating caudad in an uncal process (UP, fig. 3), or it may exhibit varying degrees of bifurcation and terminate in a pair of furcae (UF, fig. 4). The form of the uncus is peculiar to certain species and to a few species groups.

The socii, paired organs lateral to the anal opening, are entirely absent in all acrolophids.

The gnathos (GN, figs. 3–6), an organ ventral to the anus, arises from an area near the base of the uncus. Its median ventral plate may be considered absent, or at least it is not differentiated as a distinct part. It may be simple, occurring as a fused and well sclerotized structure (fig. 3), or it may exhibit varying degrees of bifurcation into a pair of lateral arms (LAGN, fig. 4). As in the case of the uncus, the form of the gnathos is peculiar to certain species and species groups. In some species having the fused gnathos, the apical portion of this organ is clothed ventrad with numerous, minute, seta-like processes which may have a sensory function during copulation.

The tegumen (TG, figs. 3–6) is actually the remaining external covering of the ninth and tenth segments which has not been differentiated into the foregoing parts and from which these parts originate as specialized sclerite structures. However, the entire sclerotized portion of the tegumen is considered to be a part of the tenth segment (i. e., the tenth tergum), the ninth segment being greatly reduced and continued dorsad as a membrane only. The sclerotized part of the tegumen articulates at its lower extremities with the vinculum and from it arise the uncus and gnathos. In the present revision, the lateral extensions of the tegumen are called lateral arms (LATG, figs. 3, 5–6).

In a number of species, there is no clear line of demarcation separating the heavily sclerotized aedeagus from the membranous, eversible vesica. In such cases, between these two structures there is a transitional area exhibiting a gradual change in degree of sclerotization. In some species, such as *A. filicicornis*, where this area of transition is armed, it may be difficult to determine whether such armature belongs to the aedeagus (as spines) or to the vesica (as cornuti). When fluid is forced into a genital capsule which has been softened by treatment in potassium hydroxide, the vesica is commonly caused to expand and reveal the true origin of such processes. In a few species, however, it has not been possible to ascertain satisfactorily whether these processes are spines or cornuti. In such cases, they are simply considered as armature of the transitional area.

It has been observed in numerous dissections that when the vesica of a prepared specimen is extruded by forcing alcohol or water into it, the relative location and direction of its cornuti may be considerably altered. This may be caused not only by the general expansion of the entire vesica but also by the unequal expansion of areas differing in degree of sclerotization. Thus, the armature of the unexpanded vesica of a specimen simply cleared in potassium hydroxide may present a quite different appearance from that of a similar specimen whose vesica has been fully expanded by the application of fluid pressure. Because of this, the location and direction of the cornuti should be considered as variable or secondary characters in comparison to their less variable or primary characters of number, size, and structure. The drawings in this revision were made from alcoholic specimens in which sufficient fluid pressure had been applied to the base of the abdomen to cause the entire genital capsule to extrude.

It has been pointed out by Busck (1931, p. 206) and others that the males in some of the groups of Microlepidoptera possess deciduous cornuti. These are loosely attached to the vesica of the penis which, in many species, is extended through the entire length of the ductus bursae and into the bursa copulatrix of the female during copulation. When the vesica is withdrawn after insemination, these cornuti are left with the spermatozoa in the bursa. Busck states that "these deciduous spines are normally flattened, very sharply pointed, and often nearly as long as the diameter of the female bursa." They are to be distinguished from the fixed cornuti which are firmly attached to the vesica and are withdrawn along with the penis after copulation.

Since the armature of the vesica has been given considerable weight in the present separation and characterization of the various species of Acrolophidae, it has been necessary to make certain that the cornuti are of the taxonomically reliable fixed type. All of the writer's studies of genitalia in this family have indicated the presence of this fixed type, a few dissections having shown only slight evidence of the possible occurrence of the deciduous type. Preparations of the vesicae of both very fresh (probably virginal) and very worn (probably nonvirginal) specimens of any one species have invariably exhibited essentially the same armature. In addition, this armature, whether in the form of very large or very small cornuti, has always been found to be quite firmly attached to the vesica, even after thorough clearing in potassium hydroxide. Lastly, various degrees of increased sclerotization have been frequently observed in those areas of the vesica receiving the bases of the cornuti. Minor variations of this armature among specimens of any one species, as well as the occasional appearance of an additional cornutus or sclerotized structure in the vesica, may be reasonably attributed to intraspecific variation.

In *Acrolophus*, fortunately, the genitalia of pinned specimens usually extrude to an extent permitting identification to species. When the terminal vestiture of the abdomen is removed with a fine brush, several genital structures usually may be observed. The uncus is almost always visible and it may be seen in both dorsal and lateral aspects. The gnathos, beneath the uncus, is often visible. Both of these structures are useful in diagnosing species groups and occasionally even species. The cucullus, representing the approximate apical half of the harpe, is almost invariably extruded. This structure is second only to the aedeagus in furnishing specific characters. The uncus, gnathos, and cucullus are well sclerotized and usually appear about the same in dried specimens as they do after having been cleared in potassium hydroxide. The apical portion of the aedeagus is only occasionally extruded in dried specimens, although it regularly appears in such species as *variabilis* and *macrophallus* where the aedeagus is greatly elongated. In most dried specimens, however, the aedeagus is somewhat distorted through the shriveled condition of its membranous vesica. Thus, it may be seen that many of the references to the genitalia in the key may be utilized without the necessity of clearing and dissecting the specimen beforehand.

Key to the Species and Subspecies of *Acrolophus*

(Based on males)

1. Labial palpi greatly elongated, recurved back over head and extending across much of all of thorax; when denuded, with basal segment never the longest of the three segments 2

   Labial palpi (a) intermediate in length, recurved back over head but extending only slightly onto anterior margin of thorax; or (b) short, only slightly to partly recurved back over head and not extending to anterior margin of thorax; but in either case, when denuded, with basal segment always the longest of the three segments 20

2. Eyes naked 3

   Eyes setose 5

3. Antennae strongly bipectinate . . . . . **1. dorsimaculus** (Dyar)

   Antennae simple, laminate (*griseus*) 4

4. Cucullus of harpe with major portion broadly expanded, with only approximate basal third considerably narrowed (fig. 30).

   2a. griseus griseus (Walsingham), new combination

   Cucullus of harpe with only approximate apical third broadly expanded, with approximate basal two-thirds considerably narrowed (fig. 35).

   2b. griseus capitatus, new subspecies

5. Each antennal segment completely encircled by ring of scales 6

   Each antennal segment clothed only dorsad or dorsolaterad with scales, or antennal segments complex and their processes free of scales 9

6. Antennae unipectinate; uncus bifid (fig. 36) . . **3. texanellus** (Chambers)

   Antennal segments simple, globose; uncus with single process minutely and acutely bifid at extreme apex (figs. 41, 42, 48); (*simulatus-acornus-bicornutus* species group) 7

7. Cucullus of harpe with apical portion broadly expanded (fig. 39); vesica of aedeagus unarmed (fig. 40) . . . . . **4. acornus,** new species
   Cucullus of harpe with apical portion not broadly expanded (figs. 43, 46); vesica of aedeagus armed with cornuti (figs. 45, 47) 8
8. Cucullus of harpe with approximate central third moderately expanded ventrad (fig. 43); vesica of aedeagus armed with approximately 6 to 12 small cornuti (figs. 44, 45) . . . . . **5. simulatus** Walsingham
   Cucullus of harpe not expanded ventrad (fig. 46); vesica of aedeagus armed with 2 large cornuti (fig. 47) . . . . . **7. bicornutus,** new species
9. Antennae strongly bipectinate 10
   Antennae unipectinate or laminate 11
10. Forewing with prominent, irregular, white patch in basal half; furcae of uncus subparallel to slightly convergent, with distance between apices much less than length of each furca (fig. 87); harpe with base of cucullus broad and indistinctly merging with costa and sacculus (figs. 83, 85); vesica of aedeagus unarmed (figs. 84, 86) 16
    Forewing without white patch; furcae of uncus divergent, with distance between apices at least equal to length of each furca; harpe with base of cucullus narrowed and separated from costa and sacculus by ventral constriction (fig. 49); vesica of aedeagus armed with numerous, small cornuti (figs. 52, 53) . . . . . **8. filicicornis** (Walsingham)
11. Harpe with long, prominent costal process overlapping cucullus (figs. 54, 58). **9. plumifrontellus** (Clemens)
    Harpe without costal process 12
12. Furcae of uncus with bases broadly separated and developed ventrad into pair of prominent, semicircular plates with dentate margins; furcae with major portions convergent and overlapping distad, with apical portions flattened dorsoventrad and divergent (figs. 61, 62, 63) . **10. mortipennellus** (Grote)
    Furcae of uncus not as above 13
13. Furcae of uncus abruptly directed or curved very strongly ventrad through angle of approximately 90 degrees (figs. 8, 9, 69); vesica of aedeagus armed with either one large cornutus (fig. 66) or two large clusters of cornuti (figs. 10, 11, 12); (*popeanellus-klotsi* species group) 14
    Furcae of uncus not curving strongly ventrad (figs. 70, 98); vesica of aedeagus either unarmed (figs. 79, 84, 86, 101) or armed with very small cornuti not arranged in clusters (fig. 97) 15
14. Furcae of uncus abruptly directed ventrad, broadly expanded and flattened in lateral aspect (figs. 9, 16, 17); vesica of aedeagus armed with two large clusters of cornuti (figs. 11, 12) . . . . . **11. popeanellus** (Clemens)
    Furcae of uncus curving strongly ventrad, unexpanded and only slightly flattened in lateral aspect (fig. 69); vesica of aedeagus armed with one large cornutus (fig. 66) . . . . . **13. klotsi,** new species
15. Furcae of uncus tubular, divergent, with distance between apices approximately equal to length of each furca (figs. 74, 75); eastern species: Missouri, Arkansas, and eastward . . . . . **14. propinquus** (Walsingham)
    Furcae of uncus somewhat flattened laterad, subparallel, with distance between apices much less than length of each furca (figs. 87, 99); southwestern species: Texas, New Mexico, and Arizona 16
16. Harpe rather slender, with base of cucullus narrowed and separated from costa and sacculus by dorsal and ventral constrictions (figs. 95, 100); forewing without prominent white patch in basal half; (*arizonellus-luriei* species group) 19

Harpe broad, with base of cucullus broad and indistinctly merging with costa and sacculus (figs. 83, 85); forewing with prominent, irregular, white patch in basal half; (*macrogaster*, in part). [See couplet 38 for species-group relationship] 17

17. Antennae bipectinate, with pectinations wider at bases than outwardly.
15a. macrogaster macrogaster (Walsingham), new combination

Antennae unipectinate or laminate 18

18. Antennae unipectinate; process of each antennal segment not laterally flattened, separated from adjacent process by space at least equal to its own thickness . . . . . **15c. macrogaster unipectinicornus,** new subspecies

Antennae simple, laminate; process of each antennal segment laterally flattened, separated from adjacent process by narrow space much less than its own thickness . . . **15d. macrogaster laminicornus,** new subspecies

19. Sacculus of harpe with ventrocaudal extremity strongly angulated (fig. 95); vesica of aedeagus armed with single row of 10 to 15 minute cornuti (fig. 97) . . . . . **17. arizonellus** Walsingham

Sacculus of harpe with ventrocaudal extremity not angulated (fig. 100); vesica of aedeagus unarmed (fig. 101) . . . . . **18. luriei,** new species

20. Each antennal segment completely encircled by at least one ring of scales; mostly smaller species, wing expanse usually less than 21 mm. 21

Each antennal segment clothed only dorsad or dorsolaterad with scales, or antennal segments complex and their processes free of scales; mostly larger species, wing expanse usually greater than 21 mm. 37

21. Eyes obviously setose 22

Eyes naked or very sparsely and obscurely scattered with exceedingly minute setae 26

22. Eyes rather sparsely clothed with recumbent or partially recurved setae; rings of antennal scales small, widely separated, directed considerably outward and resembling small funnels; forewings with small patches of upraised scales; uncus with single process minutely and acutely bifid at extreme apex (figs. 105, 106); vesica of aedeagus unarmed (figs. 104, 107, 111); (*cressoni-maculifer-crescentellus* species group) 23

Eyes rather densely clothed with erect setae; rings of antennal scales large, narrowly separated or overlapping, not funnel-shaped; forewings without patches of upraised scales; uncus bifid (figs. 116, 117, 121); vesica of aedeagus armed with cornuti (figs. 114, 115, 119, 120); (*piger-vanduzeei* species group) 25

23. Cucullus of harpe broadest in central portion, with apical portion narrowed (fig. 102); aedeagus curving through angle of approximately 180 degrees (fig. 103), with apex acute in lateral aspect (figs. 103, 104).
19. maculifer (Walsingham)

Cucullus of harpe not broadest in central portion, with apical portion slightly expanded and broadly rounded (figs. 108, 109, 110); aedeagus curving through angle of approximately 90 degrees or less, with apex narrowly rounded in lateral aspect (figs. 107, 111) 24

24. Cucullus of harpe linear or sublinear (figs. 108, 109); aedeagus curving through angle of approximately 90 degrees, with base expanded ventrad into large flaplike process curving back upon itself (fig. 107).
20. cressoni (Walsingham)

Cucullus of harpe with major apical portion curving considerably dorsad (fig. 110); aedeagus with major central portion sublinear and with only basal and apical extremities somewhat curved, with base not expanded into flaplike process (fig. 111) . . . . . **21. crescentellus** (Kearfott)

25. Cucullus of harpe fairly evenly expanded beyond base to present subsymmetrically capitate appearance (fig. 112), costa of harpe with considerable dorsal expansion caudad of point of attachment of arm of transtilla (fig. 112); vesica of aedeagus armed along dextral margin with irregular row of approximately 18 minute, weakly sclerotized, indistinct cornuti unequal in size (figs. 114, 115); wing expanse approximately 16 mm.; Florida, Texas . . . . . **22. piger** (Dyar)

Cucullus of harpe broadly and unevenly expanded ventrad beyond base to present asymmetrically capitate appearance (fig. 118), costa of harpe with only very slight dorsal expansion caudad of point of attachment of arm of transtilla (fig. 118); vesica of aedeagus armed about perimeter with approximately 15 variously sized, well sclerotized, distinct cornuti arranged in form of incomplete oval (figs. 119, 120); wing expanse usually greater than 16 mm.; Texas, Arizona . . . . . **23. vanduzeei,** new species

26. Cucullus of harpe with major portion directed considerably ventrad (figs. 122, 125) and with apical margin markedly dentate (fig. 122) or produced into at least one large, acute, spinelike process (fig. 125); (*kearfotti-pseudohirsutus* species group) 27

Cucullus of harpe with or without major portion directed considerably ventrad but with apical margin neither dentate nor produced into spinelike processes 28

27. Cucullus of harpe with central portion of ventral margin roughly dentate, with apical portion somewhat expanded; with apical margin dentate, produced into 5 to 10 teeth of various sizes, ventral tooth often the largest (fig. 122); wing expanse 17 to 21 mm. . . **24. pseudohirsutus,** new name

Cucullus of harpe with central portion of ventral margin not dentate, with apical portion somewhat narrowed; apex of cucullus emarginate, with dorsal extremity in form of subtriangular projection, with ventral extremity produced into large and elongate process directed strongly mesad (fig. 125); wing expanse 22 to 29 mm. . . . . **25. kearfotti** (Dyar)

28. Uncus bifid but with furcae closely appressed and often superficially appearing as single process with median longitudinal suture (fig. 131); (*furcatus-punctellus* species group—relationship not exceedingly close) 29

Uncus simple, with uncal process not appearing to have median longitudinal suture (figs. 138, 143) 30

29. Cucullus of harpe with apical portion considerably expanded and directed dorsad (fig. 127); aedeagus elongate and slender (fig. 128), with base moderately expanded laterad and ventrad (figs. 128, 129); vesica of aedeagus unarmed (figs. 128, 130) . . . . . **26. furcatus** (Walsingham)

Cucullus of harpe with apical portion expanded and directed ventrad (fig. 132); aedeagus of medium length and width (fig. 133), with base broadly expanded laterad into pair of subdigitate processes (figs. 133, 134); vesica of aedeagus armed with several cornuti (figs. 133, 134).

27. punctellus (Busck)

30. Cucullus of harpe directed considerably ventrad, with major apical portion broad, with dorsal and ventral margins approximately linear and parallel, with apex truncate or nearly so (fig. 139); gnathos as a rule armed laterad near apex with pair of small, acute, toothlike processes (figs. 142, 143); vesica of aedeagus with free portion broader than and almost as long as aedeagus (fig. 141) or slender but longer than aedeagus, often twisted or spiraled . . . . . **28. cockerelli** (Dyar)

Cucullus of harpe partly (fig. 135) or entirely unlike above; gnathos unarmed (fig. 138); vesica of aedeagus with only small free portion 31

31. Forewings almost as dark as hindwings, mottled with dark patches, never pale grayish white or whitish yellow; cucullus of harpe elongate and slender, with dorsal and ventral margins sublinear and subparallel, apex of cucullus with dorsal portion developed further distad than ventral portion (fig. 206); aedeagus very slender, sickle-shaped, curving through angle of approximately 90 degrees (fig. 207); vesica arising from approximate apical four-fifths of aedeagus (fig. 207). [See couplet 52 for species-group relationship] . . . . . **45. seculatus,** new species

Forewings dark to light in color; cucullus of harpe partly (fig. 148) or entirely unlike above; aedeagus not exceedingly slender, sublinear (fig. 146) or with curvature much less than 90 degrees (fig. 136); vesica arising only from apical portion of aedeagus (figs. 136, 146) 32

32. Cucullus of harpe curving somewhat ventrad; apex of cucullus expanded, emarginate, with dorsal portion developed further distad than ventral portion (fig. 135); vesica of aedeagus armed at apex with single, large cornutus (figs. 136, 137) . . **29. pyramellus** (Barnes and McDunnough)

Cucullus of harpe not as above (figs. 144, 145, 147, 148, 149); vesica of aedeagus unarmed (fig. 146); (*laticapitanus*) 33

33. Each antennal segment with 2 complete rings of scales; forewings pale whitish yellow; cucullus of harpe shaped as in figs. 144 or 145.

30a. laticapitanus laticapitanus (Walsingham), new combination

Each antennal segment with only 1 complete ring of scales; forewings pale yellow to dark; cucullus of harpe shaped as above or as in figures 147, 148, or 149 34

34. Forewings grayish white or dark; cucullus of harpe with dorsal portion of apex considerably reduced and ventral portion correspondingly produced distad (figs. 144, 145, 147) 35

Forewings pale yellow; cucullus of harpe with dorsal portion of apex developed further distad than ventral portion (figs. 148, 149) 36

35. Larger, wings mostly 20–24 mm. in expanse; but little contrast in ground color between dark forewings and hindwings; cucullus of harpe with ventral margin concave (figs. 144, 145).

30b. laticapitanus occidens Busck, new combination

Smaller, wings 17–20 mm. in expanse; grayish white ground color of forewings contrasting with dark hindwings; cucullus of harpe with ventral margin convex (fig. 147).

30c. laticapitanus occidens form **leopardus** Busck, new combination

36. Cucullus of harpe rather slender, sublinear, with dorsal and ventral margins subparallel, with apex subtruncate (fig. 148).

30d. laticapitanus heinrichi, new subspecies

Cucullus of harpe broadly and unevenly expanded, with apex broadly and unevenly rounded (fig. 149) . **30e. laticapitanus clarkei,** new subspecies

37. Uncus obviously bifid, with furcae well separated (figs. 87, 94, 155, 161). 38

Uncus simple (fig. 208), uncal process bifid only at apical extremity (fig. 189), or uncus obscurely bifid and with furcae very closely appressed (figs. 167, 180) 41

38. Antennae strongly bipectinate or strongly unipectinate; (*macrogaster-baldufi* species group, in part). [See couplet 16 for relationship] 39

Antennae simple, laminate, with segments laterally flattened 40

39. Antennae strongly bipectinate.

15b. macrogaster bipectinicornus, new subspecies

Antennae strongly unipectinate . . . . . **16. baldufi,** new species

40. Eyes heavily setose, each with prominent anterior tuft of lashes. **31. arcanellus** (Clemens)
    Eyes naked, without prominent tufts of lashes . . . . . **32. morus** (Grote)
41. Eastern species: Atlantic States; small, wing expanse rarely greater than 18 mm. 42
    Western species: Texas and westward; medium to large, wing expanse rarely less than 18 mm. 43
42. Eyes sparsely setose; cucullus of harpe with apical portion broadly and evenly expanded, capitate (fig. 162); uncus simple; vesica of aedeagus armed with 15 to 20 small cornuti (fig. 163) . . **33. forbesi,** new species
    Eyes naked; cucullus of harpe with apical portion only very slightly expanded, not capitate (fig. 164); uncus with apical portion very obscurely bifid (fig. 167); vesica of aedeagus unarmed (fig. 165) . . **34. panamae** Busck
43. Antennae strongly bipectinate, processes of each segment with separate origins 44
    Antennae simple to complex, but never as above 45
44. Labial palpi rather short, barely extending onto anterior margin of thorax; uncal process short and relatively robust, curving strongly ventrad; cucullus comprising less than apical half of harpe, with pronounced ventral constriction at base (fig. 168); aedeagus markedly asymmetrical, distinctive (figs. 169, 170); anellus armed with large, pouchlike juxta (fig. 171). **35. juxtatus,** new species
    Labial palpi of intermediate length, noticeably extending onto anterior margin of thorax; uncal process elongate and relatively slender, curving only slightly ventrad; cucullus comprising at least apical half of harpe, without ventral constriction at base (fig. 172); aedeagus asymmetrical, but entirely unlike that of above (figs. 173, 174); anellus unarmed, or with only faint trace of juxta . . . . . **36. chiricahuae,** new species
45. Cucullus of harpe very broadly expanded in lateral aspect (figs. 175, 177, 182, 184); (*persimplex-fervidus-sinclairi* species group) 46
    Cucullus of harpe not broadly expanded in lateral aspect (figs. 186, 193, 196, 199) 49
46. Forewings with major portions pale, with ground color whitish ochreous overlaid with stripes and shadings of bright reddish brown scales; cucullus of harpe markedly narrowed dorsad near base, with apex correspondingly expanded dorsad (fig. 175); aedeagus with apex produced into prominent, recurved process (fig. 176) . . . . . **37. fervidus** Busck
    Forewings not brightly and contrastingly colored as above, with ground color considerably darker; cucullus of harpe not appreciably narrowed dorsad near base, with apex only slightly expanded dorsad (figs. 177, 182, 184); aedeagus with apex not produced as above (figs. 179, 183) . . . 47
47. Antennae transitional between laminate and unipectinate, with segmental processes subglobose and considerably reduced, each process armed at apex with minute spine directed toward apex of antenna; forewing heavily suffused with fuscous merging into prominent fuscous patch in center of posterior margin; cucullus of harpe with central portion not appreciably narrowed ventrad (fig. 177), ental surface of cucullus armed with prominent clasper (fig. 178) . . . . . **38. persimplex** (Dyar)
    Antennae unipectinate or reduced bipectinate, with segmental processes not as above; forewing not heavily suffused with fuscous, without fuscous patch in center of posterior margin; cucullus of harpe with central portion considerably narrowed ventrad (figs. 182, 184), ental surface of cucullus without clasper (*sinclairi,* new species) 48

48. Antennae unipectinate; with each segmental process (fig. 181) subcircular, developed ventrad rather than laterad, somewhat thickened in lateral aspect . . . . . **39a. sinclairi sinclairi,** new subspecies

Antennae reduced bipectinate; with each segmental process (fig. 185) somewhat emarginate mesad, developed strongly laterad into pair of secondary processes narrowly rounded at apices, quite slender in lateral aspect.

39b. sinclairi nelsoni, new subspecies

49. Cucullus of harpe with ventral margin prominently dentate (fig. 186), densely clothed with stout setae; gnathos distinctively paired, with angle of bifurcation between arms broadly and evenly rounded (figs. 188, 189); arms of gnathos elongate, divergent, with apical halves narrowing and becoming very heavily sclerotized distad (fig. 188).

40. quadrellus (Barnes and McDunnough)

Cucullus of harpe with ventral margin smooth, not setose as above; gnathos single or paired, but never as above 50

50. Antennae reduced bipectinate; with each segmental process (fig. 190) somewhat emarginate mesad, developed strongly laterad into pair of secondary processes rounded at apices; aedeagus with apical margin produced into 10 or 12 small, unequally sized, finely acute, spinelike processes (fig. 195).

41. minor (Dyar)

Antennae laminate or reduced unipectinate, but with segmental processes never developed laterad; aedeagus with apical margin not produced as above 51

51. Cucullus of harpe with major central portion markedly flattened dorsoventrad and appearing quite slender in lateral aspect (fig. 196), costa of harpe produced dorsocaudad into distinct costal process (fig. 196); uncus obscurely bifid, with furcae very closely appressed and superficially appearing as single process with median longitudinal suture.

42. parvipalpus, new species

Cucullus of harpe not flattened dorsoventrad, costa of harpe without process; uncus single 52

52. Robust species; labial palpi recurved, rather closely appressed to head, with normal vestiture; sacculus of harpe developed mesoventrad into prominent process usually visible in dried specimens in ventral aspect (figs. 200, 203); gnathos rather weakly paired, flattened beneath; (*davisellus-serratus* species group) 53

Rather fragile species; labial palpi erect, not appressed to head, each segment clothed with prominent tuft of scales along anterior margin; sacculus of harpe without mesoventral process; gnathos fused (fig. 210), concave beneath, hood-shaped (fig. 219); (*variabilis-seculatus-macrophallus-vauriei* species group, in part). [See couplet 31 for *seculatus*] 54

53. Labial palpi short, extending only about as far as antennal bases; antennae laminate, with segmental processes laterally flattened and contiguous; forewings heavily suffused with grayish white; cucullus of harpe with apical portion expanded, moderately capitate (fig. 199); sacculus of harpe broadly separated caudad from its mesoventral process (figs. 199, 200); apical portion of aedeagus heavily armed ventrad with spinelike processes (fig. 201) . . . . . **43. davisellus** Beutenmüller

Labial palpi of intermediate length, extending onto anterior margin of thorax; antennae transitional between laminate and unipectinate, with segmental processes somewhat thickened transversely and not contiguous; forewings brownish, not suffused with grayish white; cucullus of harpe very slender, with apical portion not appreciably expanded (fig. 202); sacculus of harpe

almost completely fused with its mesoventral process (fig. 203); apical portion of aedeagus weakly dentate or serrate dextrad (figs. 204, 205), not spinose . . . . . **44. serratus,** new species

54. Cucullus of harpe with dorsal margin prominently emarginate and dentate near base (fig. 211); aedeagus with apical quarter to third heavily armed with series of variously sized spines (figs. 212, 213).
46. variabilis (Walsingham)

Cucullus of harpe with dorsal margin smooth (fig. 214) or very faintly serrate near base (fig. 217); aedeagus armed only at extreme apex with one or two spines (figs. 215, 216, 218) 55

55. Eyes sparsely setose; forewings brownish, not suffused with grayish white; aedeagus greatly elongated (fig. 216), with apical portion extruded in dried specimens; vesica of aedeagus armed at or near apex with large cornutus (fig. 215); Arizona . . . . . **47. macrophallus,** new species

Eyes naked or nearly so; forewings heavily suffused with grayish white; aedeagus not greatly elongated (fig. 218), usually not extruded in dried specimens; vesica of aedeagus armed at apex with 2 or 3 small cornuti (fig. 218); western Texas . . . . . **48. vauriei,** new species

Checklist

The following annotated list represents my final disposition of the names referable to the members of the genus *Acrolophus* occurring in America north of Mexico. The sequence of species and lesser categories is essentially the same as that found in the key, since the latter furnishes the best available illustration of the natural relationships within this group.

1. dorsimaculus (Dyar).
2. griseus (Walsingham).
   a. *griseus griseus* (Walsingham), new combination.
      griseus leucallactis Meyrick, new synonym.
   b. *griseus capitatus*, new subspecies.
3. texanellus (Chambers).
      hulstellus Beutenmüller, new synonym.
      barnesi (Dyar), new synonym.
4. acornus, new species.
5. simulatus Walsingham.
6. exaphristus Meyrick, incertae sedis, no specimen available.
7. bicornutus, new species.
8. filicicornis (Walsingham).
      mexicanellus (♀) Beutenmüller (Mexican).
9. plumifrontellus (Clemens).
      bombycinus (Zeller).
      cervinus (♀) Walsingham.
      angustipennellus Beutenmüller.
10. mortipennellus (Grote).
      quadripunctellus (Dyar).
      carphologus Meyrick, new synonym.
      zeellus, validation of manuscript name through placement as a new synonym.

11. popeanellus (Clemens).
    agrotipennellus (Grote).
    scardinus (Zeller), no specimen available, type ♂ not North American.
    morrisoni (Walsingham), new synonym.
    confusellus (Dyar), new synonym.
12. acanthogonus Meyrick, incertae sedis, no specimen available.
13. klotsi, new species.
14. propinquus (Walsingham).
    tenuis (Walsingham), new synonym.
    violaceellus Beutenmüller.
    busckellus (♀) (Haimbach), new synonym.
15. macrogaster (Walsingham).
    a. *macrogaster macrogaster* (Walsingham), new combination, no specimen available.
    b. *macrogaster bipectinicornus*, new subspecies.
    c. *macrogaster unipectinicornus*, new subspecies.
    d. *macrogaster laminicornus*, new subspecies.
16. baldufi, new species.
17. arizonellus Walsingham.
18. luriei, new species.
19. maculifer (Walsingham).
20. cressoni (Walsingham).
21. crescentellus (Kearfott).
22. piger (Dyar).
23. vanduzeei, new species.
24. pseudohirsutus, new name.
    hirsutus Busck, new synonym.
25. kearfotti (Dyar).
    diversus Busck, new synonym.
26. furcatus (Walsingham).
27. punctellus (Busck).
28. cockerelli (Dyar).
29. pyramellus (Barnes & McDunnough).
30. laticapitanus (Walsingham).
    a. *laticapitanus laticapitanus* (Walsingham), new combination.
    laticapitanus unistriganus (Dyar), new synonym.
    b. *laticapitanus occidens* Busck, new combination.
    laticapitanus flavicomus Busck, new synonym.
    c. *laticapitanus occidens*, form *leopardus* Busck, new combination.
    d. *laticapitanus heinrichi*, new subspecies.
    e. *laticapitanus clarkei*, new subspecies.
31. arcanellus (Clemens).
32. morus (♀) (Grote).
33. forbesi, new species.
34. panamae Busck.
35. juxtatus, new species.
36. chiricahuae, new species.
37. fervidus Busck.
    antonellus (Barnes & McDunnough), new synonym.
38. persimplex (Dyar).

39. sinclairi, new species.
    a. *sinclairi sinclairi*, new subspecies.
    b. *sinclairi nelsoni*, new subspecies.
40. quadrellus (Barnes & McDunnough).
41. minor (Dyar), new status.
    coloradellus (Walsingham), new synonym.
42. parvipalpus, new species.
43. davisellus Beutenmüller.
44. serratus, new species.
45. seculatus, new species.
46. variabilis (Walsingham).
47. macrophallus, new species.
48. vauriei, new species.

Illustrations

The male genitalia of 52 species and subspecies of *Acrolophus* are figured, entirely or in part, on pages 682–699. The 2 species and 3 subspecies whose genitalia are not illustrated are: *A. exaphristus* Meyrick, *A. acanthogonus* Meyrick, and *A. macrogaster macrogaster* (Walsingham), for which no specimens were available; *A. macrogaster bipectinicornus*, new subspecies, the genitalia of which are essentially the same as those figured for *A. macrogaster laminicornus*, new subspecies; and *A. laticapitanus laticapitanus* (Walsingham), with genitalia essentially the same as those figured for *A. laticapitanus occidens* Busck.

Family Acrolophidae Busck, 1912

Anaphorinae Walsingham, 1887, Trans. Ent. Soc. London, pp. 138, 140.—Fernald, 1888, Ent. Amer., vol. 3, no. 10, pp. 195–196.—Riley, 1888, Insect Life, vol. 1, no. 6, p. 195.—Walsingham, 1891, Proc. Zool. Soc. London, pp. 511–516, 544–545; 1897, Proc. Zool. Soc. London, p. 169.—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 306; vol. 32, no. 11, p. 326.—Barnes & McDunnough, 1913, Can. Ent., vol. 45, no. 12, p. 419.

Anaphoridae Smith, 1891, List Lep. Bor. Amer., pp. 94–95, nos. 5043–5066.

Acrolophidae Busck, 1912, Report Laguna Marine Lab., vol. 1, p. 169, May (Acrolophidae); 1912, Proc. Ent. Soc. Washington, vol. 14, no. 3, p. 184, Sept.; 1914, Proc. Ent. Soc. Washington, vol. 16, no. 2, pp. 51, 53, 54, pl. 2.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 375.— Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, nos. 8154–8195.—Comstock, 1924, Introd. to Ent., pp. 582, 589, 611.—Eyer, 1924, Ann. Ent. Soc. Amer., vol. 17, no. 3, pp. 302, 311–312, 314–317, 320–321, text fig. x; 1926, Ann. Ent. Soc. Amer., vol. 19, no. 2, pp. 241–242.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., pp. 103–104, nos. 9540–9585.—da Costa Lima, 1945, Insetos do Brasil, pp. 210–212, figs. 95–97.

Acrolophinae Forbes, 1923, Lep. New York, pp. 50, 53, 116, 119, 122.

TYPE GENUS.—*Acrolophus* Poey, 1832.

Acrolophus Poey, 1832

Acrolophus Poey, 1832, Cent. Lép. Cuba, pp. 51–53, no. 20, pl. 20, July.—Walsingham, 1887, Trans. Ent. Soc. London, p. 147.—Smith, 1891, List Lep. Bor. Amer., p. 94, nos. 5047–5058.—Dyar, 1900, Can. Ent., vol. 32, no. 10, pp. 306, 308–309; 1903, List North Amer. Lep., p. 578, nos. 6584–6589.—Meyrick, 1913, Trans. Ent. Soc. London, p. 191.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 375.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, nos. 8154–8195.—Forbes, 1923, Lep. New York, pp. 15, 115–116, 119–120.—Comstock, 1924, Introd. to Ent., p. 611.—Eyer, 1924, Ann. Ent. Soc. Amer., vol. 17, no. 3, p. 315.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., pp. 103–104, nos. 9540–9585. (Type of genus *Acrolophus vitellus* Poey; Cuban, not North American.)

Anaphora Clemens, 1859, Proc. Acad. Nat. Sci. Philadelphia, p. 260, Sept.; 1872, Tineina of North Amer. (ed., Stainton), pp. vii, 56–60.—Zeller, 1873, Verh. zool.-bot. Ges. Wien, vol. 23, pp. 214–215.—Chambers, 1878, Bull. U.S. Geol. & Geogr. Surv. Terr., vol. 4, no. 1, p. 128.—Walsingham, 1887, Trans. Ent. Soc. London, p. 155.—Smith, 1891, List Lep. Bor. Amer., p. 95, nos. 5059–5063.—Walsingham, 1891, Proc. Zool. Soc. London, p. 517.—Dyar, 1900, Can. Ent., vol. 32, no. 10, pp. 306, 309; 1900, Can. Ent.,vol. 32, no. 11, pp. 326–327; 1903, List North Amer. Lep., pp. 578–579, nos. 6591–6596.—Meyrick, 1913, Trans. Ent. Soc. London, p. 191.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 376.—Eyer, 1924, Ann. Ent. Soc. Amer., vol. 17, no. 3, p. 315. (Type of genus *Anaphora popeanella* Clemens; designated by Walsingham, Trans. Ent. Soc. London, 1887, pp. 155–156.)

Eutheca Grote, 1881, Bull. U.S. Geol. & Geogr. Surv. Terr., vol. 6, no. 2, p. 257, Sept. (a preoccupied name, being homonymous with *Eutheca* Kiesenwetter, 1877, Coleoptera).—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 310 (here confused as a synonym of *Pseudanaphora* Walsingham).—Meyrick, 1913, Trans. Ent. Soc. London, p. 191. (Type of genus *Eutheca* (*Sapinella*) *mora* Grote.)

Sapinella Kirby, 1892, Syn. Cat. Lep. Het., vol. 1, p. 524, genus 45 (Kirby proposed new name *Sapinella* to replace *Eutheca* Grote).

Eutheca (*Sapinella*) Dyar, 1895, Can. Ent., vol. 27, no. 1, p. 15.

Sapinella (*Eutheca*) Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 378.

Eulepiste Walsingham, 1882, Trans. Amer. Ent. Soc., vol. 10, p. 169, Nov.—Walsingham, 1887, Trans. Ent. Soc. London, p. 142.—Smith, 1891, List Lep. Bor. Amer., p. 94, nos. 5044–5045.—Walsingham, 1891, Proc. Zool. Soc. London, p. 511.—Dyar, 1900, Can. Ent., vol. 32, no. 10, pp. 306–307; 1903, List North Amer. Lep., p. 577, nos. 6579–6581.—Busck, 1910, Proc. Ent. Soc. Washington, vol. 11, no. 4, p. 186.—Busck, 1912, Rep. Laguna Marine Lab., vol. 1, p. 169.—Meyrick, 1913, Trans. Ent. Soc. London, p. 191.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 377. (Type of genus *Eulepiste cressoni* Walsingham.)

Pseudoconchylis Walsingham, 1884, Trans. Ent. Soc. London, p. 133, April.—Smith, 1891, List Lep. Bor. Amer., p. 90, no. 4770.—Dyar, 1903, List North Amer. Lep., p. 488, no. 5469.—Busck, 1907, Journ. New York Ent. Soc., vol. 15, no. 1, p. 20.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p.377. (Type of genus *Pseudoconchylis laticapitana* Walsingham.)

Neolophus Walsingham, 1887, Trans. Ent. Soc. London, p. 141, June.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5043.—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 306; 1903, List North Amer. Lep., p. 577, nos. 6577–6578.—Busck,

1910, Proc. Ent. Soc. Washington, vol. 11, no. 4, p. 186; 1912, Proc. Ent. Soc. Washington, vol. 14, no. 3, p. 184.—Meyrick, 1913, Trans. Ent. Soc. London, p. 191.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 377. (Type of genus *Neolophus furcatus* Walsingham.)

Hypoclopus Walsingham, 1887, Trans. Ent. Soc. London, p. 144, June.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5046.—Dyar, 1900, Can. Ent., vol. 32, no. 10, pp. 306–308; 1903, List North Amer. Lep., pp. 577–578, nos. 6582–6583, (here misspelled as "*Hypocolpus*").—Meyrick, 1913, Trans. Ent. Soc. London, p. 191.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 377.—Eyer, 1924, Ann. Ent. Soc. Amer., vol. 17, no. 3, p. 315. (Type of genus *Hypoclopus griseus* Walsingham.)

Ankistrophorus Walsingham, 1887, Trans. Ent. Soc. London, p. 146, June (a preoccupied name, being homonymous with *Ancistrophora* Schiner, 1865, Diptera).—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 306.—Meyrick, 1913, Trans. Ent. Soc. London, p. 191.

Homonymus Walsingham, 1887, Proc. Ent. Soc. London, p. liv, Nov. (new name proposed by Walsingham to replace his *Ankistrophorus*); 1907, Proc. U.S. Nat. Mus., vol. 33, p. 228.—(*Ankistrophorus*) Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 378. (Type of genus *Ankistrophorus* (*Homonymus*) *corrientis* Walsingham. Argentine, not North American.)

Felderia Walsingham, 1887, Trans. Ent. Soc. London, p. 165, June.—Smith, 1891, List Lep. Bor. Amer., p. 95, nos. 5064 & 5064a.—Dyar, 1900, Can. Ent., vol. 32, no. 10, pp. 306, 309–310; 1903, List North Amer. Lep., p. 579, nos. 6599–6600.—Meyrick, 1913, Trans. Ent. Soc. London, p. 191.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 377. (Type of genus *Acrolophus cossoides* Felder & Rogenhofer. "Ypanema," not North American.)

Ortholophus Walsingham, 1887, Trans. Ent. Soc. London, p. 169, June.—Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5065.—Dyar, 1900, Can. Ent., vol. 32, no. 10, pp. 306, 310; 1900, Can. Ent., vol. 32, no. 11, p. 327; 1903, List North Amer. Lep., p. 579, nos. 6597–6598.—Meyrick, 1913, Trans. Ent. Soc. London, p. 191.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 378. (Type of genus *Ortholophus variabilis* Walsingham.)

Pseudanaphora Walsingham, 1887, Trans. Ent. Soc. London, p. 170, June.—Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5066.—Walsingham, 1891, Proc. Zool. Soc. London, p. 517.—Dyar, 1900, Can. Ent., vol. 32, no. 10, pp. 306, 310 (here confused with *Eutheca* Grote); 1903, List North Amer. Lep., p. 579, nos. 6601–6603.—Meyrick, 1913, Trans. Ent. Soc. London, p. 191.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 378. (Type of genus *Anaphora arcanella* Clemens.)

Atopocera Walsingham, 1897, Proc. Zool. Soc. London, p. 169, Jan.—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 306; 1900, Can. Ent., vol. 32, no. 11, p. 326; 1903, List North Amer. Lep., p. 578, no. 6590.—Meyrick, 1913, Trans. Ent. Soc. London, p. 191.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 378. (Type of genus *Atopocera occultum* Walsingham. Haitian, not North American.)

Walsingham (1887a, pp. 154–155) described the genus *Caenogenes*, based on a species from Argentina, stating: "A specimen sent to me for examination some years ago by Prof. Fernald under the name *Anaphora mortipennella*, Grote, greatly resembled it in structure." In the British Museum (Natural History) there is a manuscript type ♂ specimen labeled "*Caenogenes zeella* Fernald (MS.) Illinois." Photo-

graphs of this moth and its genitalia clearly represent a typical specimen of *Acrolophus mortipennellus* (Grote). Thus, Fernald's manuscript species name (chironym) and the specimen it designates (chirotype) are synonymous with Grote's species. Forbes (1890, p. 101, pl. 6, fig. 1) refers to "*Caenogenes mortipennella*" in Illinois. However, no North American species of Acrolophidae has ever been described as new under *Caenogenes*.

1. *Acrolophus dorsimaculus* (Dyar)

FIGURES 25–29

Felderia dorsimacula Dyar, 1900, Can. Ent., vol. 32, no. 11, p. 328, Nov.; 1903, List North Amer. Lep., p. 579, no. 6600.

Acrolophus dorsimacula Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8191.— McDunnough, 1939, Check List Lep. Can. & U. S. Amer., p. 104, no. 9581.

Dyar's original description of this species follows:

Felderia dorsimacula—Palpi strongly recurved to base of thorax, pale gray before, black outwardly; head and thorax dark gray. Fore wing gray, dark on the costal half, more cinereous along internal margin, mottled with dark brown. A triangular black patch with point on centre of inner margin and the broadest side on the median vein, joined outwardly to a triangular discal patch, that is extended in a curved band nearly to apex, where it becomes obsolete. Hind wings rather light gray, a little darker toward the margin. Expanse 24 to 26 mm. Male genitalia with uncus single, a broad triangular plate, tapering rapidly to a point; harpes slender, rather flat, long, well curved at base, the tips oblique above.

Nine specimens: Huachuca Mts., Arizona; July 24 to Aug. 15 (Dr. W. Barnes); U.S. Nat. Mus., type No. 5346.

MALE GENITALIA.—Vinculum rather large, well sclerotized, otherwise typical.

Tegumen very narrow, glabrous; lateral arm elongate, sublinear, margins subparallel; dorsal area separated from base of uncus by areas of reduced sclerotization.

Harpe simple, with major portion of cucullus curving strongly toward meson of genital capsule in dorsal and ventral aspects. Costa and sacculus in lateral aspect fused, rather elongate and narrow, comprising approximate basal three-fifths of harpe, glabrous, broadest in central portion, apical portion only slightly narrowed, basal third considerably narrowed. Cucullus in lateral aspect quite distinctly set off from costa and sacculus by areas of reduced sclerotization, ectal surface heavily punctate except for glabrous basal extremity, ental surface and margins rather sparsely setose, approximate basal third slightly constricted and curving somewhat dorsad, apical two-thirds expanded and directed somewhat ventrad; in dorsal aspect approximate basal third irregularly expanded toward meson, basal

portion with heavily sclerotized margins and rather weakly sclerotized mesal area, approximate apical two-thirds to three-fourths gradually expanding distad and curving strongly toward meson, broadest near apex, apex markedly emarginate.

Transtilla with arm glabrous, well sclerotized, approximately one-fourth as long as harpe, sinuate, apical portion converging to margin of costa, terminating subacutely somewhat caudad of basal extremity of harpe.

Uncus obscurely and weakly bifid. Dorsal aspect: subtriangular, distinctly set off from tegumen by irregular areas of reduced sclerotization, cephalic margin broadly and evenly emarginate mesad, laterobasal areas finely but heavily punctate, apical portion finely and sparsely punctate, lateral margins sublinear and evenly converging caudad into furcae; angle of bifurcation obscured; furcae very short, stout, approximate, well sclerotized, sparsely punctate, evenly curving caudoventrad, apices subacute to acute.

Gnathos weakly paired, somewhat reduced, rather short, directed mostly ventrad, mesal portion weakly sclerotized, lateral margins heavily sclerotized and evenly converging distad; apical extremities short, rather stout, weakly scobinate, curving ventrocaudad, apices subacute to narrowly rounded.

Anellus very large; dorsal surface composed mostly of large, somewhat irregular, rather weakly but distinctly sclerotized area articulating with surrounding portions by means of definite membranous infoldings; remainder membranous, unarmed, juxta absent.

Aedeagus very large and distinctive, approximately two-thirds as long as harpe, considerably flattened dorsoventrad and normally resting just beneath sclerotized dorsal area of anellus, greatly expanded laterad and appearing goblet-shaped in dorsal and ventral aspects, asymmetrical, directed slightly ventrad in lateral aspect, base considerably expanded laterad and opening broadly dorsad, portion just above base constricted to about half width of base, approximate apical five-sevenths very broadly expanded laterad and opening broadly but rather indistinctly in dorsomesal and apical areas, apex very broad and irregularly emarginate; dextral margin of apical portion armed with several dozen, variously sized, heavily sclerotized, acute, spinelike processes directed laterad and distad; approximately five to six circular, well sclerotized inclusions scattered near bases of spinelike processes.

Vesica fairly large, membranous, apparently unarmed, limits vague and blending with weakly sclerotized areas of aedeagus, appearing as free and distinct membrane only at sinistral apical extremity of aedeagus.

TYPE.—Type ♂ (type no. 5346) in the U.S. National Museum.

TYPE LOCALITY.—Huachuca Mountains, Ariz.

DISTRIBUTION.—Southwestern United States. Southern Arizona.

SOURCES OF MATERIAL: California Academy of Sciences (6 ♂♂, 1 ♀), Carnegie Museum (1 ♂).

SPECIMENS EXAMINED.—8 (7 ♂♂, 1 ♀), from 2 localities:

ARIZONA: Palmerlee, Cochise Co., ♂ (date and collector unknown); Patagonia, Santa Cruz Co., 3 ♂♂, ♀ (Aug. 1, 1924, E. P. Van Duzee), 3 ♂♂ (Aug. 2, 1924, Van Duzee).

REMARKS.—This species undoubtedly ranges southward into Mexico. The specific name should be spelled *dorsimaculus* to agree grammatically with its present genus. In general, it is related to those acrolophids having elongate labial palpi, but it is not closely related to any one species. The structures on the head of *dorsimaculus* furnish a distinctive combination of elongate labial palpi, naked eyes, and bipectinate antennae. In addition, the genitalia of this species may be distinguished from those of all other acrolophids by the inward curvature of the cucullus of the harpe and by the greatly expanded, calyciform aedeagus.

I have examined the type ♂ specimen at the U.S. National Museum. It is labeled "*Felderia dorsimacula* Dyar, type no. 5346, Huachuca Mts., Ariz., July 24–30." Dr. Clarke kindly removed the genitalia of the type for me and the identity of this species was thus further confirmed. Dyar, in his list of 1903, also reported this species from Texas. However, I have seen no examples of *dorsimaculus* from that State.

2. *Acrolophus griseus* (Walsingham)

This complex species is composed of the two subspecies treated below.

2a. *Acrolophus griseus griseus* (Walsingham), new combination

FIGURES 30–34

Hypoclopus griseus Walsingham, 1887, Trans. Ent. Soc. London, p. 144, pl. 7, figs. 2, 2a, 2b, June.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5046.—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 307; 1903, List North Amer. Lep., p. 577, no. 6582.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 377.

Acrolophus griseus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8168.—Forbes, 1923, Lep. New York, pp. 120, 122.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9554.

Acrolophus leucallactis Meyrick, 1919, Exotic Microlep., vol. 2, no. 9, p. 281, Nov.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9574. (New synonymy.)

Walsingham's original description follows:

Hypoclopus griseus—*Palpi*, ♂, overarching the thorax and reaching to its posterior margin; ♀ short, standing straight forward from the head about 1 mm.

Antennae dull greyish ochreous; ♂ compressed, ovate, pilose, having a serrate appearance owing to lines of partially raised scales on their anterior sides; ♀ simple. *Head, thorax, and palpi* with an equal admixture of hoary and greyish fuscous scales. *Fore wings* greyish fuscous, profusely sprinkled with hoary scales, which predominate in a patch below the middle of the fold; a sprinkling of dark fuscous scales is also noticeable, especially along the costa, where they form a series of small dots, and at the outer end of the cell, where they are concentrated into an ill-defined dark fuscous patch; a smaller dark fuscous patch occurring beyond the middle of the fold. In the fringes patches of hoary and greyish fuscous scales alternate with each other. The apical vein is forked. *Hind wings* reddish brown; fringes cinereous. *Abdomen* cinereous; lateral claspers attenuated in the middle and widened posteriorly, their ends rounded above, obtusely angulated below. The uncus is bent over and is single, but a supplementary point with a double stem in the form of the lower mandible of a bird, coming from below it, reaches nearly as far as the uncus itself. *Exp. al.* 26 mm.

Three males and one female received from Morrison, collected in Arizona. This species may be distinguished by its almost square-ended lateral claspers, and by the length of the opposite branch of the uncus, which, although it occurs in other species, does not appear to attain the same proportions; the forking of the apical vein and the single uncus separate it from other species having much the same general appearance.

Walsingham's illustrations consisted of figure 2, ♂ genitalia—uncus and cucullus in lateral aspect and uncus, gnathos, and cucullus in dorsal aspect; figure 2a, head of ♀ in lateral aspect; and figure 2b, neuration of forewing.

Male genitalia.—Vinculum rather large but typical, as in other species.

Tegumen narrow, glabrous; lateral arm gradually and evenly narrowing to point of articulation with vinculum, margins sublinear, caudal margin very heavily sclerotized; dorsal area considerably constricted caudad, mesal portion fusing caudad with base of uncus.

Harpe simple. Ventral aspect: approximate basal two-thirds diverging caudad from meson of genital capsule, approximate apical third converging caudad toward meson. Lateral aspect: rather elongate and broad. Costa and sacculus fused, comprising approximate basal two-thirds of harpe, glabrous except for punctate and setose subdigitate ventrocaudal margin of sacculus, broadest in area caudad of point of attachment of arm of transtilla, basal portion evenly narrowing to rather narrow basal extremity. Cucullus set off from costa and sacculus by areas of reduced sclerotization, comprising approximate apical third of harpe, ventral portion of ental surface heavily punctate and setose, remainder and especially dorsal margin very sparsely punctate and setose, base constricted and with very heavily sclerotized dorsal margin, central and apical portions very broadly and evenly expanded dorsad and less broadly expanded ventrad to give marked capitate appearance, apical portion about twice

as broad as basal portion, apex broadly and evenly rounded dorsad and rather irregularly rounded ventrad.

Transtilla with arm glabrous, well sclerotized, slender, short, one-fourth to one-fifth as long as harpe, basal half diverging from and apical half converging toward margin of costa, terminating subacutely considerably caudad of basal extremity of harpe.

Uncus obscurely bifid, similar to that of *furcatus*. Dorsal aspect: base glabrous, lateral margins set off from tegumen by irregular areas of reduced sclerotization, mesocephalic portion indistinctly fused with tegumen, lateral margins very heavily sclerotized and evenly converging caudad into furcae; angle of bifurcation entirely obscured; furcae approximate, superficially appearing as single process with median longitudinal suture especially in dried or untreated specimens, elongate, narrow, heavily sclerotized, directed caudad and slightly ventrad, lateral margins sparsely punctate and setose, apices acute.

Gnathos fused, rather elongate and slender, directed caudad and slightly ventrad, mesal portion weakly sclerotized, apical portion heavily scobinate dorsad and with weakly sclerotized ventral expansion densely clothed with minute seta-like processes; lateral margins heavily sclerotized, gradually and evenly converging distad to rather narrowly rounded apex.

Anellus large, membranous, unarmed, juxta absent.

Aedeagus rather elongate and slender, approximately as long as harpe, cylindrical, asymmetrical, glabrous, sublinear in dorsal and ventral aspects except for apical portion irregularly curving somewhat sinistrad; base slightly expanded, emarginate ventrad, opening broadly dorsad; approximate apical half opening broadly lateroventrad and consisting of irregular, sclerotized, dorsal strip curving ventrad and back upon itself through angle of approximately 135° in lateral aspect; apex consisting of large, heavily sclerotized, acute, spinelike process extending free beyond vesica.

Vesica rather large, membranous, unarmed.

TYPE.— ♂ and ♀ types in the British Museum (Natural History).

TYPE LOCALITY.—"Arizona."

DISTRIBUTION.—Southwestern United States. Arizona.

SOURCES OF MATERIAL: American Museum of Natural History (1 ♂, 1 ♀); Denison University (1 ♂).

SPECIMENS EXAMINED.—3 (2 ♂♂, 1 ♀), from 2 localities, as follows:

ARIZONA: Hualapai Mountains, ♂ (July 15-30, 1921, O. C. Duffner); locality and date unknown, ♂ ("Arizona"), ♀ ("Ariz., Chas. Palm, Don. 1911").

REMARKS.—This subspecies undoubtedly ranges southward into Mexico. Its synonym, *leucallactis* Meyrick, was described from Nogales, Santa Cruz County, Ariz., just north of the Mexican border.

The ♀ listed has not been positively associated with the ♂♂ of *griseus griseus*.

In general, the complex species, *griseus*, is related to those acrolophids having elongate labial palpi, but it is not closely related to any one species. The structures on its head furnish the distinctive combination of elongate labial palpi, naked eyes, and laminate antennae. In addition, the harpe and aedeagus of *griseus* are distinct from those of all other acrolophids.

The subspecies, *griseus griseus*, differs from its close relative, *griseus capitatus*, in having a considerably darker ground color in the forewings, a differently shaped cucullus of the harpe, and a different geographical distribution.

Mr. Tams of the British Museum (Natural History) has sent me photographs labeled "*griseus* Wals., type," showing the adult ♂ and ♀ and their respective genitalia. These photographs easily confirm the identity of this subspecies.

Dyar (1900) listed the following distributional data for *griseus*: "Oracle, Arizona, June 28 (E. A. Schwarz); San Diego, Texas, May 9 (E. A. Schwarz); Brownsville, Texas, Apr. 27 (C. H. T. Townsend); Washington, D.C., July 20 (A. Busck)." The last reference, Washington, is obviously in error. Dyar further stated: "The Texas specimens are pale, the ground color an ashy white, on which the dark specks and streaks show plainly. The specimen from Oracle, Ariz., is very dark, the black markings predominating." The pale specimens from Texas, mentioned above by Dyar, are undoubtedly examples of the following new subspecies, *griseus capitatus*.

Meyrick described *Acrolophus leucallactis* as a new species in 1919. He based his description on three specimens, including both sexes, collected in July at Nogales, Arizona. The wing expanse was listed at 19–20 mm. Since 1919 *leucallactis* has appeared in the literature as a distinct species.

The ♂ and ♀ types of *leucallactis* are at the British Museum (Natural History). Mr. Tams has sent me photographs showing all three moths in dorsal aspect and the genitalia of the ♂ in ventral aspect. These agree with the corresponding photographs representing Walsingham's older species, *griseus*, the ♂ and ♀ types of which are also at that institution. The two photographs of the genital capsules of *griseus* and *leucallactis* are almost identical. There is nothing in Meyrick's description of *leucallactis* to indicate that it could not be *griseus*. Thus *leucallactis* Meyrick should be considered a new synonym of *griseus* which is treated here as a new combination, *Acrolophus griseus griseus* (Walsingham).

2b. *Acrolophus griseus capitatus*, new subspecies

FIGURE 35

FEMALE.—Unknown.

MALE.—Head, labial palpi, antennae, and thorax ashy white. Labial palpi elongate, recurved back over head and extending to posterior margin of thorax, closely appressed to head and to each other, densely clothed with large scales. Eyes large, protruding, naked, without lashes. Antennae simple, laminate, covered dorsolaterad with short scales, segmental processes set closely together throughout antennae. Forewings with ground color ashy white, markedly lighter than those of *griseus griseus*, sparsely and irregularly furnished with spots and bars of fuscous scales; markings in form of short bars along basal half of costa, distinct spot at outer end of cell, slender bar above center of fold, and diffused patch below center of fold. Hindwings brown, fringes grayish white. Legs and abdomen pale brown. Wing expanse: 22 to 28 mm.

MALE GENITALIA.—The genitalia, except for the cucullus of the harpe, are so similar between *griseus capitatus* and its companion subspecies *griseus griseus* that the foregoing description of the latter's genital structures should largely suffice for both. Those specimens representing *g. capitatus* exhibit a type of cucullus shown in figure 35, whereas my few specimens of *g. griseus* possess the type of cucullus shown in figure 30. In *g. capitatus*, the cucullus constitutes a relatively greater portion of the total length of the harpe, its basal and central portions are much narrower, and only its approximate apical third is broadly and evenly expanded dorsad and ventrad. A single dissection has revealed these additional, although less marked, genital differences in *g. capitatus:* the furcae of the uncus are very narrowly separated throughout their entire lengths, the apex of the gnathos is emarginate, and the spinelike process constituting the apex of the aedeagus is rather short and very stout. A number of other minor differences, such as those of setal arrangement, occur between the two subspecies.

TYPE.—Holotype ♂ (type no. 61433) in the U.S. National Museum.

PARATYPES.—(7 ♂♂) Illinois State Natural History Survey (6 ♂♂); U.S. National Museum (1 ♂).

TYPE LOCALITY.—Kerrville, Kerr Co., Tex. (June 1910, H. Lacey).

DISTRIBUTION.—Southwestern United States. Texas.

SPECIMENS EXAMINED.—8 (all ♂♂), from 2 localities:

TEXAS: Kerrville, Kerr Co., ♂ (June 1910, H. Lacey), ♂ (May 1911, Lacey); locality and date unknown, 6 ♂♂ ("Tex.," Andreas Bolter Collection).

REMARKS.—This subspecies probably ranges southward and westward into Mexico. As has been shown above, the complex species,

griseus, is not closely related to any other acrolophid. The subspecies, *griseus capitatus*, differs from its close relative, *griseus griseus*, in having a much lighter ground color in the forewings, a differently shaped cucullus of the harpe, and a different geographical distribution.

On the basis of the material at hand, *griseus griseus* and *griseus capitatus* should be considered distinct. However, in the event that transitional forms are found to occur in the intermediate geographical area, New Mexico and northern Mexico, the resulting single species would exhibit an unusual amount of variation in regard to its coloration and the shape of its harpe.

The subspecific name *capitatus* refers to the characteristic headlike or capitate apical portion of the harpe in this subspecies.

3. *Acrolophus texanellus* (Chambers)

FIGURES 36–38

Anaphora texanella Chambers, 1878, Bull. U.S. Geol. & Geogr. Surv. Terr., vol. 4, no. 1, pp. 79, 129, Feb.

Acrolophus texanellus Walsingham, 1887, Trans. Ent. Soc. London, p. 152, pl. 7, fig. 9.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5052, p. 112.—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 308; 1903, List North Amer. Lep., p. 578, no. 6586.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8172.—Forbes, 1923, Lep. New York, pp. 120–122, fig. 96.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9558.

Acrolophus hulstellus Beutenmüller, 1887, Ent. Amer., vol. 3, no. 7, p. 139, Oct.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5054.—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 308; 1903, List North Amer. Lep., p. 578, no. 6587.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8173.—Forbes, 1923, Lep. New York, pp. 120, 122.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9559. (New synonymy.)

Atopocera barnesii Dyar, 1900, Can. Ent., vol. 32, no. 11, p. 326, Nov.; 1903, List North Amer. Lep., p. 578, no. 6590. (New synonymy.)

Acrolophus barnesi Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8179.—Eyer, 1924, Ann. Ent. Soc. Amer., vol. 17, no. 3, p. 315.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9565.

Chambers' original description follows:

Anaphora texanella.—Very distinct from *plumifrontella*, *popeanella*, and *arcanella* Clem., and from *agrotipenella* and *mortipenella* Grote, nor can I recognize it at all in either *Scardina* or *Bombycina* as described by Zeller.

Palpi overarching the thorax; dark brown on the outward, luteous-brown on the inner surfaces. Antennae compressed, straw-yellow; thorax dark gray-brown; fore wings brown, tinged with grayish-yellow; the usual spot at the end of the disk indistinct; the other spots common to the wings of the other species I cannot find in this. One of them may be represented by an indistinct blackish line beneath the middle of the fold. Hind wings and abdomen fuscous-gray, like the thorax, and a little darker or rather less yellowish than the fore wings. Under surface of both wings grayish-fuscous. Smaller than any specimens that I have seen of the other species, having an alar expansion of only nine lines. Bosque County, Texas. [Nine lines=about 19 mm.]

Walsingham (1887) quoted Chambers' original description and stated:

> To this I may add that the antennae are compressed, flattened, having a roughened or serrated appearance caused by lines of slightly raised scales around each joint. The apical vein of the fore wing is not forked. The lateral claspers are narrow, elongate, slightly upturned from near the base, but straightened beyond, not spoon-shaped, but evenly rounded and slightly inverted at the apex. The uncus is double, straight, the points scarcely at all bent over, very short, not closely approximate, slightly diverging.

Walsingham also figured a dorsal view of the uncus and a lateral view of the uncus and cucullus for this species.

Male genitalia.—Vinculum typical, as in other species.

Tegumen glabrous; lateral arm rather elongate and broad, margins sublinear and gradually converging toward point of articulation with vinculum; dorsal area of medium width, not separated along meson.

Harpe simple. Lateral aspect: sublinear, approximate apical half considerably narrower than basal half; costa and sacculus fused, linear, comprising approximate basal half of harpe; glabrous except for sparsely punctate and setose, angulate, ventrocaudal margin of sacculus; broadest in apical third, approximate basal half gradually narrowing basad, basal extremity rather narrowly rounded; cucullus set off from costa and sacculus by dorsal and ventral constrictions and by area of reduced sclerotization, comprising approximate apical half of harpe, commonly directed slightly ventrad, dorsal portion of basal two-thirds glabrous, major portion becoming increasingly punctate and setose ectad and entad toward apex, rather slender, about two-thirds as broad as costa and sacculus, gradually narrowing toward rather narrowly rounded apex, dorsal margin sinuate, ventral margin linear to minutely sinuate in basal half and minutely sinuate in apical half; slender area extending along ventral margin markedly reduced in thickness and with smooth, glassy appearance.

Transtilla with arm of medium length and width, well sclerotized, glabrous, slightly diverging from to strongly converging toward dorsal margin of costa, terminating acutely or subacutely at or near basal extremity of harpe.

Uncus bifid. Dorsal aspect: base largely set off from tegumen by areas of reduced sclerotization, heavily punctate and setose except along meson, cephalic margin evenly emarginate mesad; lateral margins very heavily sclerotized, sublinear, gradually converging distad; angle of bifurcation rather broad, evenly rounded; furcae short, of medium width, tubular, punctate and setose, slightly diverging and curving ventrad toward apices, narrowing distad, apices finely acute.

Gnathos typically paired, directed ventrocaudad, lateral margins very heavily sclerotized; arms subparallel, approximate, weakly scobinate entad, with apices narrowly but evenly rounded.

Anellus rather large, ventral portion membranous and unarmed; juxta absent but dorsal portion noticeably thickened and darkened by increased sclerotization, with distinct longitudinal ridges, and concave beneath.

Aedeagus rather elongate and slender, approximately five-sixths as long as harpe, cylindrical, asymmetrical, sublinear in dorsal and ventral aspect, small basal portion and approximate apical two-fifths curving markedly ventrad in lateral aspect, base moderately expanded ventrad, central portion commonly armed ventrolaterad with scattering of minute spinelike processes, approximate apical third gradually and increasingly opening dextrad toward apex, apical quarter slightly expanded, apex very narrowly but evenly rounded

Vesica of medium size, bulbous, membranous, unarmed.

Type.—Type ♂ in the Museum of Comparative Zoology (not seen).

Type Locality.—Bosque Co., Tex.

Distribution.—Central and eastern United States. Kansas and Texas eastward to Maryland and Florida.

Specimens Examined.—44 (35 ♂♂, 9 ♀♀), from 18 localities:

Florida: Florida City, ♂ (Oct. 28, 1938, Brower Collection); Port Sewall, ♂ (Nov. 16–18, 1938, F. E. Watson & L. J. Sanford); Winter Park, ♂ (July 1946, A. B. Klots). Georgia: Rabun Co., ♂ (June 26, 1927, A. G. Richards, Jr.), 2 ♂♂, ♀ (July 13, 1928, Richards); Spring Creek, Decatur Co., ♂ (June 7–23, 1911, J. C. Bradley). Illinois: Chicago, ♂ (July 16, 1946, A. K. Wyatt); Putnam Co., ♂ (July 19, 1942, M. O. Glenn); Urbana, ♂ (summer, 1947, from light globe, F. F. Hasbrouck). Kansas: Douglas Co., 3 ♂♂, ♀ (July 17–22, 1940, Fritz Forbes). Maryland: Plummer's Island, ♀ (July 18, G. P. Engelhardt). Missouri: Kirkwood, ♀ (July 17, 1905, M. E. Murtfeldt), ♂ (July 27, 1907, Murtfeldt), ♂, ♀ (July 10, 1910, Murtfeldt). North Carolina: Brevard, 3 ♂♂, ♀ (July 19–31, 1942, M. J. Westfall, Jr.); Maxton, ♂ (May 20, 1944, A. B. Klots), ♂ (no date, Klots). Oklahoma: Wyandotte, ♀ (June 19, 1939, Kaiser-Nailon). South Carolina: Greenville, ♂ (July 5, 1931, Henry Townes). Texas: Brownsville, ♀ (May 29, 1932, J. O. Martin), 2 ♂♂ (June, F. H. Snow), 3 ♂♂, ♀ (June, collector unknown); Kingsville, 3 ♂♂ (June 8, 1936); Victoria, ♂ (June 24, 1917); locality unknown, 5 ♂♂ ("Tex.," Andreas Bolter collection).

Remarks.—This old species, although widely distributed, is apparently only locally common. Its considerable variation in size and color pattern undoubtedly accounts for its two synonyms. The material representing *texanellus* was received on loan from ten sources, with Cornell University furnishing about one-third of the specimens in a series of 11 ♂♂ and 4 ♀♀.

A. texanellus is related to those acrolophids having elongated labial palpi and setose eyes, from which species it may be separated by its distinctive unipectinate antennae, each segment of which is completely

encircled by a ring of scales. Although not forming a species group with any other acrolophid, *texanellus* exhibits certain affinities with *propinquus* in regard to general habitus, genital structure, and geographical distribution. However, the two species may be easily separated on the basis of antennal structure and less easily by differences in genital structure and the generally smaller size of *texanellus*. Although the genital characters of *texanellus* are both distinctive and consistent throughout my series, the size and general habitus of the moth vary considerably over its rather wide geographical range.

The type ♂ of *A. hulstellus*, in the U.S. National Museum, is labeled "type no. 403, Indian River, Florida, Beutenmueller Collection," and is equivalent to my conception of *texanellus* on the basis of its genital and antennal structure. The antennae are both unusual and characteristic in approaching a unipectinate condition while having each segment completely encircled by a ring of scales. Also in the U.S. National Museum is a slide of ♂ genitalia, labeled "*Acrolophus hulstellus* Beut., Plummers Isl., Md., Coll. A. Busck," which I found to be identical with my conception of the ♂ genitalia of *texanellus*. Thus, *hulstellus* Beutenmüller should be considered a new synonym of *texanellus* (Chambers).

The description of Dyar's *Atopocera barnesii* was based on a single ♂ specimen from Kerrville, Tex. The wing expanse was listed at 20 mm. Presumably it was named after Dr. William Barnes, from whom the specimen was received. The type, at the U.S. National Museum, is labeled "type no. 5347, Kerrville, Texas." Its genitalia were removed and mounted on a slide by August Busck on Oct. 11, 1933. After examining the moth and the slide, I was able to confirm the identity of *barnesi*, which, like the type of *hulstellus*, is equivalent to my conception of *texanellus*. Thus, *barnesi* (Dyar) should be considered a new synonym of *texanellus* (Chambers).

4. *Acrolophus acornus*, new species

FIGURES 39–42

MALE.—Head, labial palpi, antennae, and thorax ochreous suffused with fuscous. Labial palpi elongate, recurved back over head and extending to or slightly beyond center of thorax, closely appressed to head and to each other although not appressed to thorax, very densely clothed with scales. Eyes large, protruding, rather densely setose, weakly lashed. Antennae simple, with each segment globose and completely encircled by distinct ring of scales. Forewings with variable coloration, commonly pale brown and indistinctly suffused with ochreous patches. Hindwings and fringes brown. Abdomen ochreous. Wing expanse: 14 to 17 mm.

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FEMALE.—Coloration similar to that of ♂. Labial palpi rather long, porrect, closely appressed, densely clothed with large scales. Eyes somewhat smaller than those of ♂ but otherwise similar. Antennae simple, slender, completely covered by scales. Forewings more elongate and slender than in ♂, with apices subacute. Wing expanse: 19 mm.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen glabrous; lateral arm broad, narrowing at point of articulation with vinculum; dorsal area very broad, not separated along meson.

Harpe simple. Lateral aspect: sublinear, quite slender, with ventral expansion near center, capitate; costa and sacculus fused, glabrous except for punctate and setose ventrocaudal margin of sacculus, apical area expanded ventrad, dorsal margin with small expansion distad of base of arm of transtilla, narrowing considerably to base; cucullus fairly distinct from costa and sacculus, comprising somewhat less than apical half of harpe, heavily punctate and setose ectad and entad, basal third narrow, apical two-thirds considerably expanded ventrad, broadest portion near apex almost twice width of basal area, dorsal margin curving slightly dorsad toward apex, apex broadly and rather irregularly rounded.

Transtilla with arm elongate, slender, glabrous, apical third curving ventrad to overlap costa, terminating subacutely near base of harpe.

Uncus simple, almost identical with that of *bicornutus*; base subtriangular, fused with tegumen, heavily punctate, lateral margins sublinear and converging distad into base of uncal process; uncal process of medium length, tubular, sparsely punctate and setose, curving slightly ventrad toward apex, apex minutely and acutely bifid.

Gnathos fused, same as that of *bicornutus*; in form of moderately sclerotized flap directed ventrocaudad, lateral margins weakly sinuate and converging distad to form broadly rounded apex, ental surface of apex finely pitted.

Anellus membranous, unarmed, juxta absent.

Aedeagus of medium length, slender, glabrous, asymmetrical, approximately linear in dorsal and ventral aspects, basal and apical portions curving slightly ventrad in lateral aspect, base moderately expanded, basal two-thirds cylindrical, apical third opening dorsad; apex produced into small, acute, minutely dentate process.

Vesica small, membranous, unarmed.

TYPE.—Holotype ♂ (type no. 61434) in the U.S. National Museum.

PARATYPES (5 ♂♂, 1 ♀).—American Museum of Natural History (1 ♂, 1 ♀), California Academy of Sciences (1 ♂), Cornell University (1 ♂), U.S. National Museum (1 ♂), University of Kansas (1 ♂).

TYPE LOCALITY.—Palmerlee, Cochise Co., Arizona (date and collector unknown).

DISTRIBUTION.—Southwestern United States. Southern Arizona.

SPECIMENS EXAMINED.—7 (6 ♂♂, 1 ♀), from 5 localities:

ARIZONA: Oracle, Pinal Co., ♂ (July 28, 1924, E. P. Van Duzee); Palmerlee, Cochise Co., ♂ (date and collector unknown); Pima Co., "30 miles east of Quijotoa," ♂ (Aug. 28–29, 1927, collector unknown); San Bernardino Ranch, Cochise Co., 2 ♂♂ (Aug., elevation 3750 feet, F. H. Snow); Tucson, Pima Co., ♂, ♀ (July 30, 1937, A. B. Klots).

REMARKS.—The ♀ listed above probably belongs to *acornus*, although I am not absolutely certain of its correct identity. This species undoubtedly ranges southward into Mexico. It is closely related to *simulatus* and *bicornutus*, with which it forms a distinct species group. This group, as characterized in the key, consists of small moths having elongate labial palpi, setose eyes, globose antennal segments completely encircled by rings of scales, and a type of uncus consisting of a single process minutely and acutely bifid at the extreme apex.

A. acornus may be distinguished from its close relatives, as well as from all other acrolophids, by its characteristic harpe and aedeagus. The name *acornus* refers to the absence of cornuti in the vesica of the aedeagus of this species.

5. *Acrolophus simulatus* Walsingham

FIGURES 43–45

Acrolophus (?) *simulatus* Walsingham, 1882, Trans. Amer. Ent. Soc., vol. 10, p. 168, Nov.; 1887, Trans. Ent. Soc. London, p. 148, pl. 7, fig. 7.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5047.—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 308; 1903, List North Amer. Lep., p. 578, no. 6589.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8175.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9561.

Walsingham's original description follows:

Acrolophus (?) *simulatus*—Head rough; maxillary palpi none; tongue none; ocelli none. Labial palpi recurved over the head and part of the thorax; the second joint very long, roughly clothed with projecting scales beneath; third joint about half as long as the second, brushlike, with very long diverging scales on the underside. Antennae strong, slightly pubescent, somewhat serrated on both sides, especially towards the apex. The anal appendages in the male much developed, the elongated ovate side claspers not reaching beyond the upper shield, which is triangular and pointed. Fore wings with the costa arched, apex rounded, apical margin oblique, slightly convex, the dorsal margin somewhat convex, not emarginate before the rounded anal angle. Hind wings ovate, wider than the fore wings. Fore wings with twelve separate veins. The vein from the upper corner of the discal cell in the fore wings ends on the costal margin and is not forked; cell of hind wings not closed. Alternate brown and whitish ochreous patches along the costal and dorsal halves of the fore wings, the paler portions apparently predominating rather more than in *Eulepiste cressoni*, the darker portions assuming the form of two angulated fasciae; there are numerous raised

bluish fuscous scales scattered especially about the darker patches. Hind wings and cilia dull brown. Expanse 15 millims.

Six specimens in the collection of the American Entomological Society of Philadelphia, unfortunately all of them in very bad condition. So far as I can judge, the markings and colour are almost exactly similar to those of the following species (*cressoni*), also from Texas.

Walsingham (1887) later furnished an illustration of the uncus and cucullus of the ♂ genitalia in dorsolateral aspect for this species. He also commented:

To the description of this species I should wish to add that the antennae are not strictly serrated in structure, but have a serrated appearance caused by rings of slightly elevated scales. The lateral claspers slender, attenuated near the base, dilated downwards beyond; their upper edge being nearly straight, the tapering ends evenly rounded and slightly bent inwards. The uncus is single, with the point short and very little bent over. On re-examination of the cell of the hind wings I find a slender nervure closing it at the end.

Male genitalia.—Vinculum typical, as in other species.

Tegumen glabrous; lateral arm narrow, narrowing further at point of articulation with vinculum; dorsal area narrow, not separated along meson.

Harpe simple. Lateral ectal aspect: elongate, sublinear, rather slender, with ventral expansion near center. Lateral ental aspect: sacculus with very large, rounded, glabrous, dorsal expansion evenly curving cephalodorsad well beyond arms of tegumen and transtilla and finally curving cephaloventrad to base of harpe. Lateral aspect: costa and sacculus fused, elongate, with apical portion considerably expanded ventrad, narrowing to base. Cucullus distinct from costa and sacculus, comprising approximate apical two-fifths of harpe, heavily punctate and setose ectad and entad, gradually curving mesad toward apex, basal third narrow, central third somewhat expanded ventrad, apical third narrowing distad, dorsal margin sublinear, apex evenly rounded.

Transtilla with arm rather elongate, glabrous, subparallel with dorsal margin of costa, apical portion somewhat expanded and curving toward costa, terminating slightly distad of base of harpe.

Uncus simple, same as that of *bicornutus*. Dorsal aspect: base with cephalic margin weakly emarginate mesad, laterobasal areas heavily punctate, lateral margins sublinear and converging distad to base of uncal process. Uncal process of medium length, tubular, sparsely punctate and setose, curving slightly ventrad, apex minutely and acutely bifid.

Gnathos fused, same as that of *bicornutus;* in form of moderately sclerotized flap directed ventrocaudad, lateral margins weakly sinuate and converging distad to form broadly rounded apex, ental surface of apex finely pitted.

Anellus membranous, unarmed, juxta absent.

Aedeagus of medium length, slender, cylindrical, asymmetrical, sublinear in dorsal and ventral aspects, apical half curving evenly ventrad through angle of approximately 75° in lateral aspect, width nearly constant throughout except at base and apex, base moderately and irregularly expanded cephaloventrad, approximate apical fourth narrowing and opening dextrad, apex acute; median dextral area basad of opening with or without single row of approximately six to twelve, minute, acute spines of various sizes.

Vesica small, membranous, apex acute, ventral surface armed with single row of approximately six to sixteen cornuti. Cornuti rather small, nearly uniform in size, acute, directed distad, merging with much smaller spines (when present) of aedeagus to form continuous row.

TYPE.—Type ♂ in the British Museum (Natural History). Additional type material at the Academy of Natural Sciences of Philadelphia.

TYPE LOCALITY.—"Texas."

DISTRIBUTION.—Texas eastward to Florida and northward to North Carolina.

SPECIMENS EXAMINED.—56 (all ♂♂), from 3 localities:

FLORIDA: Gainesville, ♂ (June 2, 1927, traplight, J. S. Rogers), 43 ♂♂ (June 3, 1927, traplight, Rogers), ♂ (June 29, 1927, traplight, Rogers), ♂ (July 7, 1927, traplight, Rogers). All specimens from Cornell University collection. NORTH CAROLINA: Maxton, ♂ (May 16, 1944, A. B. Klots), ♂ (May 20, 1944, Klots), ♂ (no date, Klots). Specimens from American Museum of Natural History. TEXAS: Locality and date unknown, 7 ♂♂ ("Tex.," Andreas Bolter collection).

REMARKS.—*A. simulatus* should also be found in South Carolina, Georgia, Alabama, Mississippi, and Louisiana. Dyar, in 1903, reported this species from Arizona as well as from Texas; however, I have seen no examples of *A. simulatus* from Arizona. It probably ranges southward into Mexico. It is closely related to *acornus* and *bicornutus*, with which it forms a species group. This group has been characterized in the key and in the foregoing remarks on *acornus*. *A. simulatus* may be distinguished from its close relatives, as well as from all other acrolophids, by its characteristic harpe and aedeagus.

Mr. Tams of the British Museum (Natural History) has sent me photographs labeled "*simulatus* Wals., type," showing the adult ♂ and its genitalia, that confirm the identity of this species. Dr. E. P. Darlington, in a letter, 1946, has reported an additional type specimen of this species at the Academy of Natural Sciences of Philadelphia as follows: "*simulatus* Wlsh. Type. Left wings and right hind wing intact, much rubbed, sex not determined." The original description of *simulatus* represents the first instance in which the generic name, *Acrolophus*, was applied to a North American species.

6. *Acrolophus exaphristus* Meyrick, *incertae sedis*

Acrolophus exaphrista Meyrick, 1919, Exotic Microlep., vol. 2, no. 10, p. 279, Nov.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9572.

Meyrick's original description follows:

Acrolophus exaphrista—♂. 16 mm. Head, palpi, thorax dark fuscous; palpi extremely long, recurved, reaching to beyond thorax, thickened with dense rather rough scales throughout, broadly expanded at apex, joints of nearly equal length. Antennae simple, shortly ciliated. Abdomen grey; uncus moderate, single, slender, acute, rising from a triangular plate; valvae narrow, dilated terminally, angles well-marked, terminal edge slightly curved. Forewings elongate, costa gently arched, apex obtuse, termen rather obliquely rounded; 3 absent; rather dark fuscous, somewhat mottled light brownish on costal half, especially along costa; numerous small scattered dots on veins of raised blackish scales, anteriorly white; round brownish-ochreous spots suffusedly irrorated whitish on fold at ⅓ and in disc at ¾: cilia fuscous. Hindwings and cilia grey.

Florida; one specimen. In this species the uncus appears to be truly single, not merely with the two processes closely appressed.

A. exaphristus, based on a single ♂ specimen from Florida, is here treated as *incertae sedis*. The type, in the British Museum (Natural History), has not been available to me for study. Photographs furnished me by Mr. Tams and Dr. Clarke show the genitalia in ventral aspect, the aedeagus, and a dorsal view of the pinned specimen prior to dissection. Collectively they present a combination of characters I have yet to observe in a North American specimen of *Acrolophus*.

After reading the original description, I first thought *exaphristus* belonged to the *simulatus* species group and might even prove to be *simulatus* itself. However, the photographs of the genitalia indicate that this is not the case. In the *simulatus* group, the uncus is minutely bifid at the apex, the gnathos is fused into a single flap, and the cucullus of the harpe is shaped differently from the one shown in the photographs of *exaphristus*.

From the information available, *exaphristus* may be briefly diagnosed as follows: small, labial palpi elongate, antennae "simple," uncus single, gnathos paired, cucullus of harpe with apical portion expanded, aedeagus linear but with base considerably expanded and emarginate. The photograph of the aedeagus indicates that the vesica may be armed with several small, apical cornuti.

7. *Acrolophus bicornutus*, new species

FIGURES 46–48

MALE.—Head, labial palpi, antennae, and thorax ochreous suffused with fuscous. Labial palpi elongate, recurved back over head and extending to or slightly beyond center of thorax, closely appressed to

head, diverging from thorax distad, heavily clothed with scales. Eyes large, protruding, rather densely setose, moderately lashed with elongate setae. Antennae simple, with each segment globose and completely encircled by distinct ring of scales. Both forewings and hindwings brownish, with little or no color pattern, fringes slightly paler. Abdomen pale brown. Wing expanse: 11 to 16 mm.

Female.—Coloration similar to that of ♂ although generally paler. Labial palpi short, partially recurved, diverging from head and from each other distad, densely clothed with scales. Eyes fairly large but less protruding than in ♂, moderately setose, weakly lashed. Antennae simple, slender, completely covered by scales. Wing expanse: 19 mm.

Male genitalia.—Vinculum typical, as in other species.

Tegumen with lateral arm broad but narrowing sharply near point of articulation with vinculum, sparsely punctate along dorsocaudal margin; dorsal area rather narrow, not separated along meson.

Harpe simple. Lateral aspect: slender, somewhat constricted near center, apical two-fifths curving somewhat ventrad; costa and sacculus fused, glabrous except for punctate and setose ventrocaudal margin of sacculus, apical portion considerably expanded ventrad, approximate basal half narrowing somewhat toward base, basal extremity rounded; cucullus fairly well set off from costa and sacculus by ventral constriction near base, comprising approximate apical half of harpe, rather slender, heavily punctate and setose ectad and entad, apical four-fifths curving noticeably ventrad, apical half slightly expanded and with dorsal and ventral margins subparallel, apex evenly rounded.

Transtilla with arm of medium length, rather slender, glabrous, subparallel with to considerably divergent from dorsal margin of costa, terminating acutely considerably distad of basal extremity of harpe.

Uncus simple, except at extreme apex. Dorsal aspect: base with cephalic margin weakly emarginate mesad, laterobasal areas heavily punctate, lateral margins sublinear and converging distad into base of uncal process; uncal process of medium length and width, tubular, sparsely punctate and setose, curving somewhat ventrad toward apex, extreme apex minutely and acutely bifid.

Gnathos fused, in form of moderately sclerotized flap directed ventrocaudad, lateral margins weakly sinuate and converging distad into broadly rounded apex, dorsal surface of apex finely pitted.

Anellus large, membranous, unarmed, juxta absent.

Aedeagus rather large in comparison with other genital structures, asymmetrical, glabrous, basal extremity weakly expanded, base curving considerably ventrad, basal two-fifths cylindrical, approximate apical three-fifths broadly opening dorsad and gradually curving

ventrad toward apex; apex almost spinelike, acute, heavily sclerotized, directed somewhat ventrad.

Vesica large, membranous, armed with pair of large cornuti: cornutus nearest base of vesica large, linear, heavily sclerotized, acute, with base expanded and fusing with large irregular mass of partially sclerotized tissue embedded in vesica; cornutus nearest apex of vesica similar but only one-third to two-thirds as large, embedded in larger and more elongate area of partial sclerotization to completely lacking this irregular basal area.

TYPE.—Holotype ♂ (type no. 61435) in the U.S. National Museum.

PARATYPES(16 ♂♂).—American Museum of Natural History (4 ♂♂); Cornell University (7 ♂♂); Illinois State Natural History Survey (3 ♂♂); U.S. National Museum (2 ♂♂).

TYPE LOCALITY.—Lake Alfred, Polk Co., Fla. (July 13, 1928, at light, L. J. Bottimer).

DISTRIBUTION.—Kansas and Texas eastward to Florida.

SPECIMENS EXAMINED.—18 (17 ♂♂, 1 ♀), from 6 localities:

FLORIDA: Lake Alfred, Polk Co., 2 ♂♂ (July 13, 1928, at light, L. J. Bottimer). KANSAS: Onaga, Pottawatomie Co., 2 ♂♂ (June 17 and 22, 1901, at light, F. F. Crevecoeur), ♂ (July 13, 1901, Crevecoeur), ♂ (no date, Crevecoeur). TEXAS: Corpus Christi, Nueces Co., ♂ (May 14, 1943, at light, W. M. Gordon), ♂ (Sept. 2, 1943, at light, Gordon), 3 ♂♂, ♀ (Sept. 25–Oct. 15, 1943, Gordon); Kerrville, Kerr Co., ♂ (May 1906, F. C. Pratt); Sanderson, Terrell Co., ♂ (May 16, 1918, J. Ch. Bradley); Uvalde, Uvalde Co., ♂ (May 19, 1918, J. Ch. Bradley); locality and date unknown, 3 ♂♂ ("Tex.," Andreas Bolter collection).

REMARKS.—One of the smallest acrolophids occurring in America north of Mexico, *bicornutus* should be found throughout the Gulf States. In addition, it probably ranges southward and westward into Mexico. The only available ♀ specimen, received from Cornell University, has not been positively associated with the ♂♂ of this species.

A. bicornutus is closely related to *simulatus* and *acornus*, with which it forms the species group characterized in the key and in the foregoing remarks on *acornus*. The members are distinguished from one another, as well as from all other acrolophids, on the basis of their harpes and aedeagi. The latter organ is especially valuable for the separation of these three otherwise similar species. The name *bicornutus* refers to the two characteristic cornuti in the vesica of the aedeagus of this species.

8. *Acrolophus filicicornis* (Walsingham)

FIGURES 49–53

Felderia filicicornis Walsingham, 1887, Trans. Ent. Soc. London, p. 167, pl. 8, figs. 22, 22a, June.—Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5064.—Dyar, 1903, List North Amer. Lep., p. 579, no. 6599.

Felderia filicornis Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 310 (name misspelled); 1903, List North Amer. Lep., p. 579, no. 6599 (Dyar here lists his previous misspelling as a second synonym of *filicicornis*).

Acrolophus mexicanellus (♀) Beutenmüller, 1888, Ent. Amer., vol. 4, no. 2, p. 29, May (originally described from Mexico).—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8190 (syn.).—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 104, no. 9580 (syn.).

Felderia filicicornis mexicanellus Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5064a.

Felderia mexicanellus Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 310 (syn.); 1903, List North Amer. Lep., p. 579, no. 6599 (syn.).

Acrolophus filicicornis Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8190.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 104, no. 9580.

Acrolophus filicornis Eyer, 1924, Ann. Ent. Soc. Amer., vol. 17, no. 3, p. 315 (name misspelled).

Walsingham's original description follows:

Felderia filicicornis—Labial palpi strongly recurved, reaching to the posterior margin of the thorax. *Antennae* strongly bipectinate, the pectinations being slightly narrower at their bases, wider outwardly, subochreous. *Head, thorax, and palpi* thickly clothed with fuscous hair-like scales, tipped with hoary white. *Fore wings* mottled greyish and brownish fuscous; about twelve brownish fuscous ill-defined dots along the costal margin, not arranged in pairs, but distributed at approximately equal distances; a brownish fuscous spot at the end of the cell, from which a streak of the same colour extends obliquely downwards to the anal angle; fringes greyish fuscous, speckled with whitish. *Hind wings* brownish, with a faint purplish tinge; fringes pale greyish brown. *Abdomen* brownish. *Under side of all the wings* pale cinereous, the costal margin of the fore wings not defined by a pale line as in *arizonella*. *Exp. al.* ♂, 26 mm.; ♀, 27–31 mm. The lateral claspers of the male spoon-shaped, widened in the middle, tapering outwardly, and rounded at the apex; the uncus double, the two points parallel, shorter and wider apart than in *arizonellus*.

Hab. One male and five females from Arizona, collected by Morrison.

This species has much the appearance of *arizonella*, Wlsm., but the peculiar form of the antennae in the male at once serves to distinguish it.

Walsingham's illustrations consisted of figure 22, the uncus and cucullus of the harpe in dorsolateral aspect, and figure 22a, the ♂ antenna in dorsolateral aspect.

Male genitalia.—Vinculum typical, as in other species.

Tegumen typical, glabrous, not separated along meson.

Harpe simple. Lateral aspect: linear, constricted near center. Costa and sacculus fused, comprising slightly more than basal half of harpe, approximate apical half broad and somewhat expanded dorsad, basal half approximately half as broad as apical half and with dorsal and ventral margins subparallel, basal extremity broadly and evenly rounded. Cucullus set off from costa and sacculus by constrictions and area of reduced sclerotization, rather broad; ectal surface strongly convex, heavily punctate and setose; ental surface strongly concave, rather weakly punctate and setose; basal half slightly narrowed, apical

half somewhat expanded ventrad, apical third directed strongly mesad, apex broadly and irregularly rounded.

Transtilla with arm of medium length, rather slender, linear, glabrous, converging to dorsal margin of costa, terminating acutely slightly distad of basal extremity of harpe.

Uncus bifid. Dorsal aspect: base heavily punctate and setose especially nearest cephalic margin, cephalic margin fused to tegumen, lateral margins sublinear and moderately convergent distad; angle of bifurcation broad and with or without small, rounded, mesal projection; furcae rather short, robust, conical, setose, broadly separated, gradually narrowing and diverging distad, directed somewhat ventrad, apices acute.

Gnathos paired; arms rather small, well sclerotized, rather narrowly separated, slightly to strongly convergent distad, apical portions commonly overlapping, apical thirds weakly and minutely pitted entad, apices narrowly rounded.

Anellus large, membranous, unarmed, juxta absent.

Aedeagus rather elongate and slender, asymmetrical, weakly sinuate, basal and apical portions directed somewhat ventrad in lateral aspect, base moderately expanded ventrad, basal three-fifths slender and cylindrical, apical two-fifths gradually expanding distad, approximate apical fourth opening broadly dextrad; apex bluntly and irregularly rounded laterad, with process arising from dorsal margin. Dorsal process consisting of rather elongate, slender, moderately sclerotized, acute projection partially and indistinctly fusing with adjacent vesica and curving strongly ventrad toward apex; armed from base to apex with irregular row of approximately 20–35 minute, acute spines directed distad and becoming progressively larger distad.

Vesica rather large, membranous, dorsal surface unarmed or with several minute cornuti, dextral and ventral surfaces densely armed with 100 or more cornuti; cornuti minute, all approximately equal in size, well sclerotized, with apices acute and blackened, pointing in all directions.

TYPE.—♂ and ♀ types in the British Museum (Natural History).

TYPE LOCALITY.—"Arizona."

DISTRIBUTION.—Southwestern United States and Mexico. Arizona and Texas southward into Mexico.

SOURCES OF MATERIAL.—American Museum of Natural History (3 ♂♂, 2 ♀♀); California Academy of Sciences (1 ♀); Carnegie Museum (1 ♀); Cornell University (1 ♂); Denison University (2 ♂♂, 1 ♀); Ohio State University (3 ♂♂, 1 ♀).

SPECIMENS EXAMINED.—15 (9 ♂♂, 6 ♀♀), from 10 localities:

ARIZONA: Boulder Springs, Mohave Co., ♂ (July 1–15, 1921, O. C. Duffner); Elgin, ♂, ♀ (July 17, 1948, C. & P. Vaurie); Huachuca Mountains, 2 ♂♂, ♀

(July 20, 1937, D. J. & J. N. Knull); Hualapai Mountains, ♂, ♀ (July 15–30, 1921, O. C. Duffner); Oracle, ♀ (July 28, 1924, E. P. Van Duzee); Paradise, Cochise Co., ♀ (July, O. C. Poling); Patagonia, ♂, ♀ (July 18, 1948, C. & P. Vaurie). Texas: Davis Mountain, ♂ (Aug. 2, 1937, D. J. & J. N. Knull); Fort Davis, ♂ (July 2, 1948, C. & P. Vaurie); Valentine, ♂ (July 7, 1917, collector unknown).

Remarks.—This species is here recorded from Mexico on the basis of its synonym, *mexicanellus* Beutenmüller, the holotype ♀ of which was collected in Mexico City. *A. filicicornis* is related to those species having elongate labial palpi, setose eyes, and strongly bipectinate antennae. However, it is not closely related to any other acrolophid. It may be easily separated from its nearest relatives on the basis of its distinctive color pattern, uncus, harpe, and aedeagus. In appearance, *filicicornis* is one of the more robust members of the genus.

Photographs furnished me by Mr. Tams of the British Museum (Natural History), labeled "*filicicornis* Wals., type," show the adult ♂ and ♀ and their respective genitalia and confirm the identity of this species. Dyar (1900) listed the following distributional data for *filicicornis*: "Oracle, Arizona, July 12 (E. A. Schwarz); Fort Grant, Arizona, July 20 (H. G. Hubbard); Brownsville, Texas, June 10 (C. H. T. Townsend)."

Beutenmüller described *A. mexicanellus* in 1888 as a new Mexican species. Following the description, he stated: "This species has a superficial resemblance to *Acrolophus hulstellus*, Beut., but may be readily distinguished from it by being a much larger heavier insect, and also by the rounded apices of the wings. Expanse of wings 30 mm. 1 ♀. Taken by Mr. Julius Mohn in the City of Mexico."

In 1891, Smith placed *mexicanellus* as a subspecies of the slightly older species, *Felderia filicicornis* Walsingham, by presenting the trinomial, *Felderia filicicornis mexicanellus*, in his check list.

In 1900, Dyar properly placed "*Mexicanellus*" as a synonym of "*Felderia filicornis*, Walsingham," despite his misspelling. Since that date, *mexicanellus* has consistently appeared in the literature as a synonym of *filicicornis*.

The type ♀ of *A. mexicanella*, in the U.S. National Museum is labeled "type no. 408, Mexico City, Mexico, Beutenmueller Collection," and I find no differences between this specimen and my series of ♀♀ previously determined as *filicicornis*. Thus, *mexicanellus* (♀) Beutenmüller should be considered an old synonym of *filicicornis* (Walsingham) with Dyar receiving the credit for its placement.

9. *Acrolophus plumifrontellus* (Clemens)

FIGURES 54–58

Anaphora plumifrontella Clemens, 1859, Proc. Acad. Nat. Sci. Philadelphia, p. 261, Sept.; 1872, Tineina of North Amer., pp. vii, 39, 56–57, 60, fig. 3.—Grote, 1872, Can. Ent., vol. 4, no. 8, p. 143.—Zeller, 1873, Verh. zool.-bot. Ges. Wien, vol. 23, p. 217.—Chambers, 1878, Bull. U.S. Geol. & Geogr. Surv. Terr., vol. 4, no. 1, p. 129.

Anaphora bombycina Zeller, 1873, Verh. zool.-bot. Ges. Wien, vol. 23, p. 216, May.—Chambers, 1878, Bull. U.S. Geol. & Geogr. Surv. Terr., vol. 4, no. 1, p. 129.—Walsingham, 1887, Trans. Ent. Soc. London, pp. 149–150 (syn.).

Acrolophus plumifrontellus Walsingham, 1887, Trans. Ent. Soc. London, p. 149, pl. 7, figs. 5–5e.—Beutenmüller, 1889, Ent. Amer., vol. 5, no. 1, p. 9.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5048.—Walsingham, 1891, Proc. Zool. Soc. London, pp. 513, 544.—Walsingham, 1897, Proc. Zool. Soc. London, p. 174.—Dyar, 1900, Can. Ent., vol. 32, no. 10, pp. 308–309; 1903, List North Amer. Lep., p. 578, no. 6584.—Holland, 1903, Moth Book, p. 443, pl. 48, fig. 43.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8170.—Barnes & Lindsey, 1921, Contrib. Nat. Hist. Lep. North Amer., vol. 4, no. 4, pl. 40, fig. 6.—Forbes, 1923, Lep. New York, pp. 120, 122, fig. 97.—Eyer, 1924, Ann. Ent. Soc. Amer., vol. 17, no. 3, p. 286 (text fig. I), p. 315, pl. 35, fig. 7.—Eyer, 1926, Ann. Ent. Soc. Amer., vol. 19, no. 2, pp. 244–245, pl. 18, fig. 16.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9556.

Acrolophus plumifrontellus var. *angustipennella* Beutenmüller, 1887, Ent. Amer., vol. 3, no. 7, p. 140, Oct.

Acrolophus cervinus (♀) Walsingham, 1887, Trans. Ent. Soc. London, p. 151, pl. 7, fig. 6, June.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5051.—Dyar, 1900, Can. Ent., vol. 32, no. 10, pp. 308–309 (syn.?).—Dyar, 1903, List North Amer. Lep., p. 578, no. 6585.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8171.—Forbes, 1923, Lep. New York, p. 122 (syn.).—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9557.

Acrolophus bombycina Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5048 (syn.).—Walsingham, 1897, Proc. Zool. Soc. London, p. 174 (syn.).—Dyar, 1903, List North Amer. Lep., p. 578, no. 6584 (syn.).—Holland, 1903, Moth Book, p. 443 (syn.).—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8170 (syn.).—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9556 (syn.).

Acrolophus angustipennellus Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5049.—Dyar, 1903, List North Amer. Lep., p. 578, no. 6585.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8171 (syn.).—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9557 (syn.).

Acrolophus angustipenellus Dyar, 1900, Can. Ent., vol. 32, no. 10, pp. 308–309 (syn.). (Misspelling.)

Acrolophus (*Anaphora*) *plumifrontella* Busck, 1903, Proc. Ent. Soc. Washington, vol. 5, p. 186.

Acrolophus (*Anaphora*) *bombycina* Busck, 1903, Proc. Ent. Soc. Washington, vol. 5, p. 186 (syn.).

Clemens' original description of *plumifrontellus*, which probably did not actually appear in print until sometime in 1860, is quoted below:

Anaphora plumifrontella—Labial palpi reddish brown. Thorax dull brown tinged with reddish. Fore wing rubescent and maroon brown intermixed, the former hue prevailing along the fold, at the base along costa and disc, dusted with dark brown; with a dusky or dark brownish spot on the end of the disc, one about the middle of the fold and another near the base. In some specimens these spots are quite indistinct. Hind wings dusky brown. Exp. al. 17 lines [about 36 mm.]. Female not known.

Clemens mentioned elsewhere in his paper that the labial palpi in the ♂ were "greatly developed, ascending and thrown back on the dorsum of the thorax, which they equal in length." Clemens' figure for *plumifrontellus*, an engraving of the head of the ♂, was subsequently published by Stainton (1872, p. 60, fig. 3) in his collected edition of the late Dr. Clemens' writings on North American Tineina. In the same paper describing *plumifrontellus*, but preceding his erection of the genus, *Anaphora*, Clemens stated:

Plumifrontella is found here (Philadelphia) in June and July, when it may be taken at light. I am unacquainted with the embryonic history of the species described, and have never met with the female *Plumifrontella*. The genus, I think, belongs to the group Exapatidae, and as the females in some of the genera are apterous, that of *Plumifrontella* may be unsupplied with wings. The antennae should be examined very carefully, otherwise their peculiar structure will be overlooked and mistaken for simple, filiform organs.

Walsingham (1887, p. 149) made the following comments on Clemens' original description of *plumifrontellus*:

To this description we may add that the antennae are compressed, not strictly serrated throughout, but only slightly so towards the tip; lateral claspers spoon-shaped, rather abruptly dilated and bent, with a pair of supplementary claspers above them, nearly as long as themselves; uncus double, the points parallel and divided.

At the same time, Walsingham (1887, pl. 7, figs. 5–5e) furnished a number of illustrations for this species. These consisted of: figure 5 adult ♂, dorsal aspect (in color); figure 5a head of ♂, lateral aspect; figure 5b head of ♀, lateral aspect; figure 5c ♂ genitalia-uncus and cucullus of harpe, with "supplementary clasper," lateral aspect; figure 5d ♀ genitalia, ventral (?) aspect; and, figure 5e neuration of forewing.

Beutenmüller (1889) described the ♀ of *plumifrontellus* as follows:

The undescribed ♀ of this species differs from the ♂ only in having long porrected labial palpi, and the markings of the primaries much suffused with the ground color. Expanse, 19 mm. Length of palpi, 5 mm.

One example. Coll. Beutenmüller. Taken at Parkville, L.I., N.Y., July, 1888. Another specimen, much larger than the one I possess, is in the collection of Mrs. A. T. Slosson, taken in the White Mountains, N.H.

Male genitalia.—Vinculum typical, as in other species, but rather heavily sclerotized.

Tegumen glabrous; lateral arm rather elongate and slender, strongly narrowing to point of articulation with vinculum, dorsal margin rather weakly sclerotized and sinuate, ventral margin well sclerotized and sublinear; dorsal area of medium width, not separated along meson.

Harpe divided, with prominent costal process. Lateral aspect: approximate apical two-fifths directed somewhat ventrad and considerably narrower than basal three-fifths, basal three-fifths sublinear; costa and sacculus indistinctly fused, comprising approximate basal half of harpe, glabrous except for punctate and setose ventrocaudal margin of sacculus, broadest in apical fifth, basal four-fifths with dorsal and ventral margins sublinear and gradually converging basad to broadly rounded basal extremity, dorsocaudal portion of costa considerably expanded and giving rise to large costal process; costal process arising from dorsobasal angle near base of cucullus, approximately four-fifths as long as cucullus and two-fifths as long as entire harpe, sublinear, directed considerably ventrad, major portion closely subparallel with dorsal margin of cucullus, small apical portion overlapping ectal surface of cucullus dorsad, dorsal and ventral margins sinuate and subparallel, approximate dorsal third to half very heavily sclerotized and becoming minutely spinose toward apex, ventral half to two-thirds weakly sclerotized and minutely punctate, apical one-sixth to one-fourth very densely and minutely spinose, apex weakly expanded and evenly rounded; cucullus partially set off from costa and sacculus by areas of reduced sclerotization, comprising approximate apical half of harpe, broadest in basal fifth, markedly constricted ventrad immediately distad of basal fifth, apical three-fifths irregularly expanding toward apex, basal third glabrous, apical two-thirds becoming increasingly punctate and setose ectad and entad toward apex, margins sinuate, dorsal margin very heavily sclerotized in basal three-fifths, ventral margin heavily sclerotized in basal two-fifths and with or without apical half minutely dentate, apex rounded.

Transtilla with arm elongate and slender, approximately three-tenths as long as harpe, well sclerotized, glabrous, basal two-thirds subparallel with dorsal margin of costa, apical third converging with and underlapping costa, terminating acutely somewhat distad of basal extremity of harpe.

Uncus bifid. Dorsal aspect: base rather large, subtriangular, rather indistinctly fused with tegumen, heavily punctate and setose; lateral margins very heavily sclerotized, sublinear, gradually converging distad; angle of bifurcation rather narrow, rounded; furcae of medium length and width, tubular, well sclerotized, slightly diverging

and gradually curving ventrad toward apices, basal portions sparsely punctate and setose, apical portions glabrous, gradually narrowing distad to acute apices.

Gnathos typically paired, curving ventrocaudad, well sclerotized; arms rather short and broad, finely and densely pitted entad, diverging distad, apices broadly and unevenly rounded.

Anellus membranous, unarmed, juxta absent.

Aedeagus of medium length and width, approximately two-thirds as long as harpe, sublinear in dorsal and ventral aspects, basal and apical portions directed slightly ventrad in lateral aspect, cylindrical, asymmetrical, glabrous, base unexpanded and opening dorsad, approximate apical half to two-thirds opening broadly dorsad and consisting of well sclerotized ventral wall expanding slightly toward apex, apex irregularly rounded and emarginate.

Vesica large, membranous, consisting of several infolded layers, armed dorsad with approximately 50 minute cornuti; cornuti more or less alined in dense row in central portion and also scattered through apical portion of vesica, mostly subtriangular and acute, pointing in all directions, variously sized, some short and triangular, others longer, several asymmetrically bifid.

TYPE.—Type ♂in the Academy of Natural Sciences of Philadelphia.

TYPE LOCALITY.—Presumably Philadelphia, Pa.

DISTRIBUTION.—Central and eastern United States. Nebraska and Texas eastward to New Hampshire and Florida.

SPECIMENS EXAMINED.—317, from 80 localities, as follows (the large number of specimens available for study has made it advisable to reduce the distributional data for this common species largely to the localities and months of occurrence):

ARIZONA: One ♂ from the American Museum of Natural History, labeled "Ariz., Chas. Palm, Don. 1911"; this record is very questionable. ARKANSAS: Camden (June). CONNECTICUT: East River (July); Hamden (July); High Ridge (July); New Haven (June). FLORIDA: Clewiston (April); Florida City (June, Sept.); Gainesville (June and July, traplight); La Belle (April); Lake Placid (July, Archbold Biological Station); Orlando (April, June, Aug.); Port Sewall (April); Punta Gorda (May); Sanford (April, June); Stemper (June); Tampa (April and May, at light); Winter Park (May, June, July). GEORGIA: Screven Co. (July, 1 ♀ with mite on abdomen); Spring Creek, Decatur Co. (June, July); Tallapoosa (July). ILLINOIS: Dubois (July, at light); Elizabethtown (June, at light). INDIANA: Hessville (June, July); Scottsburg (June); Tremont (June, July). KANSAS: Caldwell (June, at light); Douglas Co. (June); Manhattan (June); Medora (June); Montgomery Co. (June). MARYLAND: Baltimore (July). MISSISSIPPI: A. & M. College, State College (June, July). MISSOURI: Glencoe (June); Kirkwood (May, June, Sept.); Mineola (July); St. Louis (June). NEBRASKA: Lincoln (June, July). NEW HAMPSHIRE: Franconia (no date). NEW JERSEY: Browns Mills (May); Irvington (July); Lakewood (May); New Brunswick (July); Ramsey (June, Sept.); Weymouth (June). NEW YORK: Millwood (June), Long Island: Brooklyn (no date); Greenport (Aug.); Mattituck (July);

Orient (June, July, Aug.); Patchogue (July); Richmond Hill (July); Roslyn (July). North Carolina: Black Mountains (no date); Brevard (June, July, Aug.); Connestee Falls, near Brevard (July); Hickory (July); Maxton (May, June); Pineola (July); Pisgah ("Base of Mt. Pisgah," July); Raleigh (June, July, Oct.). Ohio: Granville (June, July); West Lafayette (July, at light). Oklahoma: Broken Bow (June); Strang (June); Wyandotte (June). Pennsylvania: Cedar Top (June); "Clarksval." (July); Finleyville (June, July); Harrisburg (July); Lancaster (July); New Brighton (July); Oak Station, Allegheny Co. (June); Phoenixville (no date); Pittsburgh (July, Aug., Oct.); Washington County (July). South Carolina: Myrtle Beach (June, July). Tennessee: Camp Forrest (June); Monteagle (June, July). Texas: Galveston (May); also, one ♀, without an abdomen, from the American Museum of Natural History, labeled "Tex., Chas. Palm, Don. 1911." West Virginia: Williamson (July).

Remarks.—One of the first three acrolophids described from the United States, *plumifrontellus* ranks second only to *popeanellus* in extent of distribution and abundance of individuals. These three factors explain its relatively large synonymy. The material representing *plumifrontellus* was received on loan from numerous sources. Good series containing both sexes are to be found in the collections of the American Museum of Natural History, the California Academy of Sciences, and Cornell University.

A. plumifrontellus is related to those acrolophids having elongate labial palpi, setose eyes, laminate antennae, bifid uncus, and paired gnathos. It may be easily distinguished by its harpes, each of which bears a large and prominent costal process overlapping the cucullus. This process, clearly observable in dried specimens, causes the cucullus of the harpe to appear as a double or divided structure. The genital characters of *plumifrontellus* are consistent throughout my large series and they are quite distinct from those of all the other acrolophids treated here. It is one of the largest and most robust species of *Acrolophus* in America north of Mexico.

I have not examined the type specimen of this species. Busck (1903), in his report on Clemens' types of Tineina deposited in the collection of the Academy of Natural Sciences in Philadelphia, stated:

> *Anaphora plumifrontella* Clemens. One somewhat rubbed type, Clemens' No. 10; alar exp., 33 mm. This type verifies the present conception of the species, as defined by Walsingham, with *bombycina* Zeller as synonym. It belongs to the genus *Acrolophus* Poey. A large series, collected at light by the writer at Washington, D.C., and compared with Clemens' type, is in the U.S. National Museum.

Darlington (in a letter, 1946) has reported that this type is still at Philadelphia: "*plumifrontella* Clem. Type, ♂, much rubbed and not distinguishable by maculation; right wings expanded, only. Abdomen gone." The combined information I have been able to gather for *plumifrontellus* leaves no doubt as to the proper identity and correct concept of this species. I have carefully checked the U.S. National Museum's series of specimens determined as *plumifrontellus* and found

them to agree with my previous concept of this moth. In addition, at the Museum there are several slide preparations of ♂ genitalia, labeled "*plumifrontellus* Clem.," agreeing with my figures representing this species.

Walsingham (1897) reported *plumifrontellus* from the West Indies (Cuba and Puerto Rico). Barnes and Lindsey (1921) have published a photograph of a preparation of the entire ♂ genitalia of this species in ventral aspect.

Zeller, in describing *Anaphora bombycina* as a new species in 1873, concluded his discussion of Clemens' genus *Anaphora* by saying of his own series of specimens: "Whether I have Clemens' species among my own before me, I cannot decide with certainty from his descriptions; therefore I am giving the latter under separate names." He described *scardina* and *bombycina* at considerable length, and was aware of the similarity between his *bombycina* and Clemens' *plumifrontella*, for in his remarks following his description of the former he stated: "The maroon-brown, on which Clemens places considerable stress in the case of his *plumifrontella*, I fail to find throughout my specimens." Zeller listed the sources of his material as follows: "Native land of the ♀ (according to Lederer), Buenos Ayres; the two ♂♂, which I obtained through Dr. Packard, presumably come from Massachusetts." Thus, there is a strong suggestion that the series he considered as *bombycina* contained at least two different species. Walsingham (1887), in placing *bombycina* as a synonym of *plumifrontellus*, stated:

> In Zeller's series are four specimens; two from Massachusetts, sent by Mr. Packard and labeled "*bombycina*, Z."; a third from New York, with a label in Mr. Grote's handwriting, "*plumifrontella*, Clem."; the fourth is labeled "*bombycina*" in Zeller's writing, and is a female, evidently of a different species, from Buenos Ayres, received from Lederer. Professor Zeller (Verh. z.-b. Ges. Wien, 1873) mentions his doubts about this South American female, but remarks that his scruples were removed by the fact that "the wing-veins correspond exactly" with those of the male from Massachusetts. We may thus safely conclude that *bombycina* and *plumifrontella* are one and the same species.

Since 1887, *bombycina* has consistently appeared in the literature as a synonym of *plumifrontellus*. Despite the fact that Zeller apparently had a mixed series representing *bombycina*, there is no reason to doubt that his North American ♂♂ were *plumifrontellus*. Photographs furnished by Mr. Tams, labeled "type ♂, *bombycina* Zell.," show, through a dorsal view of the adult and a ventral view of the entire ♂ genitalia, that it is unmistakably a typical specimen of *plumifrontellus*. Thus, *bombycina* should be considered an old synonym of *plumifrontellus* and Walsingham should be given credit for sinking it. The name is spelled *bombycinus* to agree grammatically with its present genus, *Acrolophus*.

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Walsingham described the ♀ of *A. cervinus* as a new species in 1887. His brief description was annotated as follows:

> Exp. al. 34 mm. Two females collected by Belfrage in Texas on the 16th and 18th May (about 1868) respectively. I have not seen the male of this species, but, although probably closely allied to *plumifrontellus*, the narrow fore wings with straight costa and almost straight oblique apical margin show it to be distinct from that species.

There is nothing in Walsingham's description of and comment on *cervinus* to prove that it could not be *plumifrontellus*. In addition, his single illustration of the head of the ♀ in lateral aspect appears about the same as his figure of the ♀ head for *plumifrontellus*.

In 1900, Dyar properly suspected *cervinus* to be synonymous with *plumifrontellus* when he said of the former: "The genitalia of this form do not differ perceptibly from those of *plumifrontellus*, Clem. The moths are smaller, paler and less strongly marked, somewhat narrower winged; but I doubt the specific distinctness of the form." However, Dyar continued to list *cervinus* as a distinct species in his check list of 1903.

The type ♀ is at the British Museum. A photograph from Tams labeled "*cervinus* Wals., type ♀" shows the adult in dorsal aspect. It is evident that the type specimen is simply a pale or faded ♀ of *plumifrontellus*. Thus, *cervinus* Walsingham should be considered an old synonym of *plumifrontellus* (Clemens) with Dyar and Forbes receiving most of the credit for properly placing it.

In 1887, Beutenmüller briefly described his "*Acrolophus plumifrontellus*, Clem., var. *angustipennella*, n. var." as follows: "This variety differs from the type form in having the wings much narrower, and the markings almost absent. It is also much smaller. Expanse of wings 25 mm. 6 ♂, Georgia and Fla."

I have received numerous specimens from Georgia, Florida, and elsewhere answering to Beutenmüller's brief description of *angustipennella* quoted above. Examination of the genitalia of these moths has clearly shown them all to be simply minor geographical variations of *plumifrontellus*.

The type ♂ in the U.S. National Museum is labeled "type no. 402, Florida, Beutenmueller Collection." Its genitalia had been removed and mounted on a slide by August Busck on Aug. 9, 1920. These confirmed the identity of *angustipennellus* with *plumifrontellus*. Therefore, *angustipennellus* Beutenmüller should be considered an old synonym of *plumifrontellus* (Clemens) with Dyar receiving most of the credit for its proper placement.

10. *Acrolophus mortipennellus* (Grote)

FIGURES 59–64

Anaphora mortipennella Grote, 1872, Can. Ent., vol. 4, no. 7, p. 137, July.—Chambers, 1878, Bull. U.S. Geol. & Geogr. Surv. Terr., vol. 4, no. 1, p. 129.—Walsingham, 1882, Trans. Amer. Ent. Soc., vol. 10, p. 167.

Acrolophus mortipennella Grote, 1886, Can. Ent., vol. 18, no. 10, p. 199.

Acrolophus mortipennellus Walsingham, 1887, Trans. Ent. Soc. London, p. 150.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5050.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8169.—Forbes, 1923, Lep. New York, pp. 120, 122, fig. 98.—Comstock, 1924, Intro. to Ent., p. 611.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9555.

Caenogenes mortipennella Forbes, 1890, Sixteenth Rep. Ill., p. 101, pl. 6, fig. 1.

Acrolophus quadripunctellus Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5057 (first appearance in print of Beutenmüller's manuscript name).—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8169 (syn.).—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9555 (syn.).

Hypoclopus mortipennellus Dyar, 1900, Can. Ent., vol. 32, no. 10, pp. 307–308.—Forbes, 1905, Twenty-Third Rep. Ill., pp. 44, 95–98, fig. 78.

Hypocolpus mortipennellus Dyar, 1903, List North Amer. Lep., p. 578, no. 6583.

Hypoclopus quadripunctellus Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 307, Oct. (syn.) (Beutenmüller's manuscript name validated by Dyar).

Hypocolpus quadripunctellus Dyar, 1903, List North Amer. Lep., p. 578, no. 6583 (syn.).

Acrolophus carphologa Meyrick, 1919, Exotic Microlep., vol. 2, no. 9, p. 280, Nov.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9573. (New synonymy.)

Caenogenes zeella Fernald, MS. (chironym). (New synonymy.)

Grote's original description follows:

Anaphora mortipennella—♂.—Labial palpi reflexed, thrown back over and as long as the dorsum of thorax, but not closely applied, thickly scaled but less so than in allied species, fuscous outwardly along the sides, dead whitish on the inside. Head and thorax above dead or dirty whitish. Primaries pale, dirty whitish, with heavily sprinkled black scales on costal region at base, fading outwardly. A black scale patch at extremity of discal cell, and a larger one on submedian fold, below median vein, at about the middle of the wing; parallel with this at base, a few black scales. There is a faint sprinkling of black scales over the median nervules, and about internal angle are two or three better marked black points on the margin. Four costal black marks before the apex, the first of these above discal spot; other costal marks towards the base of the wing. Fringes fuscous, faintly lined. Secondaries fuscous, much darker than, and strangely contrasting with, the pallid primaries. Beneath both wings fuscous with ochrey stains. The basal joint of labial palpi is prominently dark fuscous or blackish outwardly. Expanse 25 mm. Central Alabama. June.

Smaller than *A. plumifrontella*, and easily recognized by its pallid discolorous fore wings, which are also a little more determinate at apices and internal angle than usual.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen glabrous; lateral arm of medium length, margins well sclerotized and sinuate, caudal portion markedly broad, remaining

portion gradually narrowing cephalad to become very narrow at point of articulation with vinculum; dorsal area rather broad and with mesal portion consisting largely of prominent, very heavily sclerotized, pentagonal or subcircular plate produced mesocaudad between and articulating laterad with lateral margins of base of uncus.

Harpe simple. Lateral aspect: apical half very slender, approximate apical quarter curving strongly ventrad; costa and sacculus fused, comprising approximate basal three-sevenths of harpe, broadest in apical half, basal half narrowing basad to subacute basal extremity; glabrous except for punctate and setose, subdigitate, ventrocaudal margin of sacculus; cucullus partially set off from costa and sacculus by ventral area of reduced sclerotization, comprising apical four-sevenths of harpe, with approximate apical three-fourths very slender; basal half curving considerably dorsad, rather sparsely punctate and setose ectad and entad; apical half curving evenly and strongly ventrad, becoming more heavily punctate and setose ectad and entad toward apex; apex rather narrow, evenly rounded.

Transtilla with arm rather short, approximately one-fifth as long as harpe, moderately sclerotized, glabrous, basal two-thirds slender and subparallel with dorsal margin of costa, apical third expanded and overlapping costa, apex rounded, terminating at or near basal extremity of harpe.

Uncus prominently bifid, large, very distinctive. Dorsal aspect: base large, nearly rectangular, glabrous, mesobasal portion weakly sclerotized and fusing with dorsomesal plate of tegumen, mesocaudal portion very weakly sclerotized to membranous; lateral margins very heavily sclerotized, subparallel, distinctly set off from tegumen laterad by areas of greatly reduced sclerotization, basal portions considerably expanded laterad; angle of bifurcation very broad; furcae with bases broadly separated and produced mesoventrad into narrowly separated pair of prominent, heavily sclerotized and darkened, sparsely punctate and setose, semicircular plates with dentate margins; furcae large, heavily sclerotized, very sparsely setose, curving or directed very strongly ventrad; basal portions tubular, convergent, commonly overlapping distad; apical portions flattened dorsoventrad, markedly divergent; apices appearing acute or subacute in dorsal, ventral, and lateral aspects; apices expanded, broadly and evenly rounded in caudal aspect.

Gnathos paired, moderately sclerotized, directed ventrocaudad; arms large, elongate, flattened, overlapping distad, apical portions finely pitted, apices broadly and evenly rounded.

Anellus membranous, unarmed, juxta absent.

Aedeagus rather short, approximately four-sevenths as long as harpe, stout, somewhat flattened dorsoventrad, tubular, asymmetri-

cal, weakly sinuate in dorsal and ventral aspects, approximate apical half curving somewhat ventrad in lateral aspect, base very weakly and irregularly expanded ventrad, central portion bearing series of dorsodextral ridges, apical portion gradually narrowing and opening irregularly ventrad and distad.

Vesica membranous, consisting of compactly infolded layers, armed with two large cornuti: cornuti heavily sclerotized and darkened, asymmetrical, directed distad, each with basal half irregularly expanded, apices acute; basal cornutus largest, approximately one-third as long as aedeagus; apical cornutus about half as large as basal cornutus, situated at apex of vesica.

TYPE.—Type ♂ in the Academy of Natural Sciences of Philadelphia.

TYPE LOCALITY.—"Central Alabama."

DISTRIBUTION.—Central and eastern United States. Iowa, Kansas, and Texas eastward to Pennsylvania, Virginia, and South Carolina.

SPECIMENS EXAMINED.—88, from 30 localities (1 ♀ without data):

ALABAMA: Flatwood, ♂ (June 10, 1917); La Place, near Tuskegee, ♂ (June 9, 1917). ILLINOIS: Champaign, 5 ♂♂ (June 8–28, 1946, at light, J. L. C. Rapp and W. F. Rapp); "Northern Illinois," ♂ (June 1906, M. E. Murtfeldt); Palos Park, ♂ (July 6, 1912, A. Kwiat), ♂ (July 4, 1940, A. K. Wyatt); Putnam Co., 11 ♂♂, 2 ♀♀ (May 29 to July 10, 1933 to 1943, M. O. Glenn); Urbana, ♂ (June 15, 1887, at light, Hart), ♂ (June 12, 1912, at light), 6 ♂♂, ♀ (June 21–26, 1943, at light, F. F. Hasbrouck, P. C. Lurie, F. A. Orr). INDIANA: Hessville, ♂ (June 10, 1911, A. Kwiat); Tremont, ♂ (June 20, 1931, A. K. Wyatt). IOWA: Denison, ♀ (June 25, 1949); Sioux City, ♀ (June 16, 1925, at light, C. N. Ainslie). KANSAS: Clark Co., 3 ♂♂ (May and June, elevation 1962 feet, F. H. Snow); Douglas Co., ♀ (June 10, 1925, mite on abdomen, R. H. Beamer); Lawrence, ♂ (May, twilight, E. S. Tucker); Manhattan, ♂, 4 ♀♀ (May 29 to June 2, 1933, gasoline light, H. L. Nonamaker), ♀ (June 14, 1939, H. D. O. Miller); Onaga, ♂ (no date, F. F. Crevecoeur). MISSOURI: Glencoe, ♂ ("Rockwoods Res.," June 4, 1942, H. I. O'Byrne); Kirkwood, 9 ♂♂, ♀ (June and July, 1890 to 1912, M. E. Murtfeldt); St. Louis, ♀ (July 9, 1904, H. McElhose); Willard, ♂ (June 9, A. E. Brower). OHIO: Granville, 7 ♂♂ (July 3–22, 1928 and 1929, A. W. Lindsey). PENNSYLVANIA: Finleyville, 4 ♂♂, ♀ (June 9 to July 1, Engel collection); Pittsburgh, ♂ (June 10, Ehrman collection). SOUTH CAROLINA: Anderson, ♂ (June 5, 1917). TENNESSEE: Locality unknown, 2 ♂♂ ("Tenn.," Cornell University collection). TEXAS: Brownsville, ♂ (June 5, 1932, five mites on abdomen, J. O. Martin); Burnet Co., ♂ (date and collector unknown); Uvalde, ♂ (May 16, 1928); locality unknown, 6 ♂♂ ("Texas," Andreas Bolter collection). VIRGINIA: Dinwiddie, ♂ (June 1, 1917).

REMARKS.—*A. mortipennellus*, an old, widely distributed, and locally common species, has a relatively large synonymy with material received on loan from thirteen sources. Among the larger series are those in the collections of the author (11 ♂♂, 1 ♀), Cornell University (17 ♂♂, 4 ♀♀), the American Museum of Natural History (2 ♂♂, 5 ♀♀), and Mr. Murray O. Glenn of Magnolia, Ill. (11 ♂♂, 2 ♀♀).

A. mortipennellus is related to those acrolophids having elongate labial palpi, setose eyes, laminate antennae, bifid uncus, and paired gnathos. It may be easily distinguished from all other members of the genus by its uncus, the furcae of which have their bases very broadly separated and developed ventrad into a pair of prominent plates. The apical portions of these furcae, easily observable in undissected specimens, are also very distinctive. The genital characters of *mortipennellus* are consistent throughout my fairly large series and they serve well in separating this species from all others treated here. The color pattern and general habitus of this rather frail moth also distinguish it from its congeners.

Darlington in a letter (1946) reports on the type specimen of this species at the Academy of Natural Sciences: "*mortipennella* Grote. Type ♂, much rubbed but in recognizable condition; all wings and abdomen present." It has also been inferred to be at Cambridge, Massachusetts (see following discussion on status of *A. quadripunctellus*). There seems to be little doubt as to the identity of Grote's *mortipennellus*. The original description agrees very closely with my series of specimens representing this species. In addition, most workers agree upon the concept of *mortipennellus*, since practically all of the many specimens I have seen determined by others as this species have proved to be both alike and representative of this moth. At the U.S. National Museum there are several slide preparations, labeled "*mortipennellus* Grote," containing ♂ genitalia. These also agree with my concept of the species in question.

Beutenmüller's manuscript name, *A. quadripunctellus*, first appeared in print in 1891 in Smith's checklist, where it was listed as a valid species. Dyar (1900) referred to the name in Smith's list as "*quadripunctellus*, Beut. (*ined.*)," indicating it was *ineditus*, i.e., "not made known, unpublished." In addition, Dyar validated *quadripunctellus* by properly placing it as a synonym of the older species, *mortipennellus* (Grote), which in turn he transferred to the genus, *Hypoclopus*. Thus, the synonym emerged as *Hypoclopus quadripunctellus* Dyar. At the end of his discussion of *mortipennellus*, Dyar listed the following distributional data: "Texas (coll. Beutenmüller, type of *quadripunctellus*); Texas, Sept. 20 (Belfrage); Central Missouri, Aug. 12 and 15 (coll. C. V. Riley); Kansas (Crevecoeur); Georgia (coll. Beutenmüller); Texas (coll. Beutenmüller, labeled 'compared with type of *A. mortipenella* at Cambridge, Mass.')." Since there was no published description for *quadripunctellus*, it is apparent that Dyar had Beutenmüller's manuscript type specimen (chirotype) available for study.

In 1903, the combination, *quadripunctellus* Dyar, appeared as a synonym of *H. mortipennellus* in Dyar's checklist. Since that date, *quadripunctellus* has consistently appeared in the literature as a synonym of *mortipennellus*.

There is no indication that Beutenmüller actually did publish a description of *quadripunctellus*. He invariably described his new species in this group under *Acrolophus*, and the combination, *A. quadripunctellus* Beutenmüller, is not listed in the Zoological Record between the years 1891, when it first appeared in Smith's checklist, and 1886, when Beutenmüller's name first appeared as an author in the Zoological Record.

The type ♂ is in the U.S. National Museum main collection and is labeled "type no. 406, Texas, Beutenmueller Collection." The type specimen now lacks the abdomen and hindwings, but its characteristic labial palpi and coloration of the forewings unquestionably identify it as an example of *mortipennellus*. Thus, *quadripunctellus* (Dyar) should be considered an old synonym of *mortipennellus* (Grote) with Dyar receiving the credit for its placement.

Meyrick described *A. carphologa* as a new species in 1919 on the basis of a single ♂ specimen from Iowa. Since that time, *carphologa* has appeared in the literature as a distinct species.

The type ♂ is at the British Museum (Natural History). Two photographs labeled "*carphologa* Meyr." from Tams very clearly reveal, through a dorsal view of the moth and a lateroventral view of its entire genital capsule, that *carphologa* is a typical example of *mortipennellus*. In addition, Meyrick's description of *carphologa* can be quite easily recognized as a description of *mortipennellus*.

Thus, *carphologus* Meyrick should be considered a new synonym of *mortipennellus* (Grote), the change in spelling bringing grammatical agreement between species and genus.

Two photographs from Tams labeled "*Caenogenes zeella* Fernald (MS), Illinois" represent an unpublished species which, at the present time, is based only upon Fernald's manuscript species name (chironym) and the type ♂ specimen (chirotype) it designates. The photographs of Fernald's *zeella*, showing a dorsal view of the pinned moth and a lateroventral view of its genitalia, clearly reveal that it is a typical example of *mortipennellus*, a species occurring frequently in Illinois. Therefore, I propose to validate Fernald's manuscript species, *zeella*, by placing it as a new synonym of *A. mortipennellus* (Grote). The name is spelled *zeellus* to agree grammatically with the present generic name.

11. *Acrolophus popeanellus* (Clemens)

FIGURES 5–24

Anaphora popeanella Clemens, 1859, Proc. Acad. Nat. Sci. Philadelphia, p. 261, Sept.; 1872, Tineina of North Amer., pp. vii, 57, 60, fig. 4.—Grote, 1872, Can. Ent., vol. 4, no. 7, p. 137.—Grote, 1872, Can. Ent., vol. 4, no. 8, p. 143.—Zeller, 1873, Verh. zool.-bot. Ges. Wien, vol. 23, pp. 215–216.—Chambers, 1878, Bull. U.S. Geol. & Geogr. Surv. Terr., vol. 4, no. 1, p. 129.—Walsingham, 1887, Trans. Ent. Soc. London, pp. 138, 155–156, 161–162, pl. 8, figs. 11, 11a, 11b, 11c.—Riley, 1890, Insect Life, vol. 3, no. 1, pp. 27–28.—Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5061.—Walsingham, 1891, Proc. Zool. Soc. London, pp. 515, 545.—Walsingham, 1897, Proc. Zool. Soc. London, p. 172.—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 309.—Dyar, 1900, Can. Ent., vol. 32, no. 11, p. 327.—Busck, 1903, Proc. Ent. Soc. Washington, vol. 5, p. 187.—Dyar, 1903, List North Amer. Lep., p. 579, no. 6594.—Holland, 1903, Moth Book, p. 443 (fig. cited is not *popeanellus*).—Forbes, 1905, Twenty-Third Rep. Ill., pp. 44, 95–98.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, pp. 376, 396.

Anaphora agrotipennella Grote, 1872, Can. Ent., vol. 4, no. 7, p. 137 (♂), July.—Grote, 1872, Can. Ent., vol. 4, no. 8, pp. 142–143 (♀), Aug.—Murtfeldt, 1876, Can. Ent., vol. 8, no. 10, pp. 185–186.—Chambers, 1878, Bull. U.S. Geol. & Geogr. Surv. Terr., vol. 4, no. 1, p. 129.—Walsingham, 1882, Trans. Amer. Ent. Soc., vol. 10, p. 167.—Walsingham, 1887, Trans. Ent. Soc. London, pp. 138, 161–162 (syn.).—Forbes, 1890, Sixteenth Rep. Ill., p. 98.—Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5061 (syn.).—Walsingham, 1897, Proc. Zool. Soc. London, p. 172 (syn.).—Busck, 1903, Proc. Ent. Soc. Washington, vol. 5, p. 187 (syn.).—Dyar, 1903, List North Amer. Lep., p. 579, no. 6594 (syn.).—Holland, 1903, Moth Book, p. 443 (syn.).

Anaphora scardina Zeller, 1873, Verh. zool.-bot. Ges. Wien, vol. 23, p. 215, May.—Chambers, 1878, Bull. U.S. Geol. & Geogr. Surv. Terr., vol. 4, no. 1, p. 129.—Walsingham, 1887, Trans. Ent. Soc. London, pp. 161–162 (syn.).—Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5061 (syn.).—Walsingham, 1897, Proc. Zool. Soc. London, p. 172 (syn.).—Busck, 1903, Proc. Ent. Soc. Washington, vol. 5, p. 187 (syn.).—Dyar, 1903, List North Amer. Lep., p. 579, no. 6594 (syn.).—Holland, 1903, Moth Book, p. 443 (syn.).

Acrolophus agrotipennella Grote, 1886, Can. Ent., vol. 18, no. 10, p. 199.—Forbes, 1923, Lep. New York, p. 121 (syn.).

Acrolophus agrotipennellus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8185.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9575.

Anaphora morrisoni Walsingham, 1887, Trans. Ent. Soc. London, p. 157, pl. 8, fig. 12, June.—Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5059.—Dyar, 1900, Can. Ent., vol. 32, no. 11, p. 327; 1903, List North Amer. Lep., p. 578, no. 6593. (New synonymy.)

Acrolophus confusellus Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5056 (first appearance in print of Beutenmüller's manuscript name).—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8182.—Forbes, 1923, Lep. New York, pp. 120–121 (syn.?).—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9568.

Anaphora confusellus Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 309, Oct. (Beutenmüller's manuscript name validated by Dyar); 1903, List North Amer. Lep., p. 578, no. 6592. (New synonymy.)

Acrolophus morrisoni Barnes & McDunnough, 1917, Check List Lep. Bor. Amer.,

p. 191, no. 8180.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9566.

Acrolophus popeanellus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8184.—Forbes, 1923, Lep. New York, pp. 25, 120–122, figs. 19, 95.—Comstock, 1924, Intro. to Ent., p. 611.—Eyer, 1924, Ann. Ent. Soc. Amer., vol. 17, no. 3, p. 315, pl. 35, fig. 2 (mislabeled).—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9570.

Acrolophus popeanella Meyrick, 1919, Exotic Microlep., vol. 2, no. 9, p. 279.

Acrolophus scardina Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8184 (syn.).—Forbes, 1923, Lep. New York, p. 121 (syn.).—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9570 (syn.).

Clemens' original description of *popeanellus*, which probably did not actually appear in print until sometime in 1860, is as follows:

Anaphora Popeanella—Labial palpi dark brownish, whitish? at the tip in the ♀. Thorax dull brownish in the ♂, with the tegulae tipped behind with gray; whitish? tinged with brown in the ♀. Fore wings brownish luteous or dull reddish brown, with luteous or yellow along the fold and inner margin, a spot on the disc and one on the middle of the nervules of the same hue, with a dark brown spot between them; a dark brown spot on the fold beneath median vein, most frequently semicircular, with a short, dark brown streak at the base on the submedian vein and another parallel to it beneath the median. The anterior margin striated from the costa with dark brown, with a subterminal row of dark brown spots *above the branches of the median vein*, and the ends of the nervules dotted with the same hue; cilia pale yellowish brown. Hind wings brownish yellow, cilia the same. Exp. al. 12 to 18 lines [about 25.5 to 38 mm.]. Male and female alike. From Smithsonian Institution. Capt. Pope's collection in Texas.

Clemens mentioned elsewhere in his paper that the labial palpi in the ♂ were "greatly developed, ascending and thrown back on the dorsum of the thorax, which they equal in length." He also mentioned that the antennae of the ♂ were "distinctly serrated beneath." Clemens' figure for *popeanellus*, an engraving of the head of the ♀, was subsequently published by Stainton (1872, p. 60, fig. 4) in his collected edition of the late Dr. Clemens' writings on North American Tineina.

Walsingham (1887, p. 162) made the following comments on Clemens' original description of *popeanellus:*

Now, so far as the antennae and palpi are concerned, Clemens' observation "male and female alike" is certainly misleading. The antennae of the male are stout and deeply serrated, "with the ends of the articles finely ciliated," as described by him. Those of the female are simple. The lateral claspers are elongate, spoon-shaped, scarcely dilated, and evenly rounded. The uncus double, angulated above, and bent over at right angles, with a conspicuous thickening at the angle.

At the same time, Walsingham (1887, pl. 8, figs. 11–11c) furnished a number of illustrations for this species. These consisted of: (fig.11) adult ♂, dorsal aspect (in color); (fig. 11a) head of ♂, lateral aspect; (fig. 11b) head of ♀, lateral aspect; and, (fig. 11c) ♂ genitalia — uncus and cucullus of harpe, dorsal and lateral aspects.

MALE GENITALIA.—Vinculum typical. Ventral aspect: in form of moderately sclerotized, U-shaped pouch receiving and supporting bases of harpes. Lateral aspect: narrowing dorsocaudad to point of articulation with lateral arm of tegumen.

Tegumen with lateral arm quite broad, gradually narrowing cephalad to point of articulation with vinculum, approximate ventral half punctate, dorsal half glabrous, ventral margin heavily sclerotized and sinuate, dorsal margin moderately sclerotized and sublinear; dorsal area broad, glabrous, rather weakly sclerotized but not emarginate mesad.

Harpe simple, slightly variable. Lateral aspect: width medium, sublinear or with apical half curving somewhat ventrad; costa and sacculus fused, comprising approximate basal half of harpe, broadest in apical portion at point of attachment of arm of transtilla, gradually narrowing basad to rather narrowly rounded basal extremity, dorsal margin very heavily sclerotized; glabrous except for heavily punctate and setose, considerably expanded, subdigitate, caudal portion of sacculus; cucullus partially separated from costa and sacculus by dorsal constriction and ventral area of reduced sclerotization, comprising apical half of harpe, commonly curving somewhat ventrad and mesad, markedly constricted dorsad near base, major apical portion rather broad, heavily punctate and setose ectad and entad except for glabrous dorsal portion of basal two-thirds, apex broadly and evenly to irregularly rounded.

Transtilla with arm approximately one-third as long as harpe, slender, linear to sublinear, well sclerotized, glabrous, rather closely subparallel with dorsal margin of costa, terminating considerably distad of basal extremity of harpe, apex slightly expanded and rounded.

Uncus prominently bifid, somewhat variable but very distinctive. Dorsal aspect: base large, heavily punctate and setose, partially set off from tegumen by lateral areas of reduced sclerotization; lateral margins well sclerotized, sublinear to sinuate, converging distad; angle of bifurcation narrowly rounded to acute; furcae with basal portions approximate, broad, strongly narrowing distad, heavily punctate and setose. Lateral aspect: furcae abruptly directed ventrad to ventrocephalad at angle of 90 degrees or more, broadly expanded, laterally flattened, subtriangular, punctate and setose, closely subparallel to weakly divergent ventrad, gradually narrowing to acute apices.

Gnathos paired, curving ventrocaudad, lateral and apical portions well sclerotized, large mesobasal portion membranous; arms flattened, densely scobinate entad, apical portions overlapping, apices rather narrowly rounded.

Anellus membranous, unarmed, juxta absent.

Aedeagus approximately three-fifths as long as harpe, considerably flattened dorsoventrad, sublinear in dorsal and ventral aspects, approximate apical third curving somewhat ventrad in lateral aspect, asymmetrical in all aspects, glabrous, base broadly and irregularly expanded laterad and ventrad, basal half tubular, apical half opening broadly and irregularly dextrad; apical portion consisting simply of one or two, elongate, slender, moderately sclerotized, dorsosinistral strips terminating acutely or subacutely.

Vesica large, membranous, armed with two prominent clusters of cornuti: cornuti variously sized, mostly large, heavily sclerotized and darkened, linear, with apices finely acute; basal cluster largest, located dorsodextrad near base of vesica, containing 4–13 cornuti; apical cluster smaller, located dextrad nearer apex of vesica, containing 2–8 cornuti. The number of cornuti in each cluster varies from specimen to specimen and thus constitutes the chief intraspecific variation to be found in the genitalia of this species (see the tabulation, below, for examples of this variation).

In the ♂ genitalia of all the individuals of *popeanellus* that have been examined, the presence of two distinct clusters of cornuti in the vesica has proved to be a consistent and positive specific character. However, these cornuti commonly vary in size and number between the two clusters of any one individual as well as between the corresponding clusters of any two individuals. Thus, they furnish a good example of an intergrading, intraspecific variation in regard to their sizes, numbers, and ratios between the basal and apical groups. This variation is illustrated by a sampling of 18 specimens listed in the following table.

TABLE 1.—*Intraspecific variation of cornuti in* A. popeanellus

	Cornuti		
Specimen	*Basal*	*Apical*	*Total*
1	13	5	18
2	10	6	16
3	9	2	11
4	8	7	15
5	8	6	14
6	8	6	14
7	8	3	11
8	7	8	15
9	7	7	14
10	7	6	13
11	7	5	12
12	7	5	12
13	7	2	9
14	6	5	11
15	6	3	9
16	5	4	9
17	4	5	9
18	4	4	8

The basal cluster may contain as few as 4 cornuti to as many as 13, the apical cluster may contain from 2 to 8, and the total for both clusters ranges from 8 to 18. The basal cluster usually contains the most cornuti, but occasionally its number is equaled or even exceeded by the number in the apical cluster. Individually, the cornuti vary in size from minute to very large. This variation is essentially nongeographic.

TYPE.—Two type specimens in the Academy of Natural Sciences of Philadelphia.

TYPE LOCALITY.—"Texas."

DISTRIBUTION.—This species has a very wide range. It has been reported from northern South America, Central America, and Mexico, as well as from the United States where it is quite common except in the northwestern states and the extreme north and west. It has been recorded from Arizona, New Mexico, and Texas northward through Oklahoma, Kansas, and Nebraska and eastward to Pennsylvania, New Jersey, North Carolina, and Florida.

SPECIMENS EXAMINED.—606, from 106 localities. Large series containing both sexes are to be found in the collections of the author, the American Museum of Natural History, and the University of Kansas. At least one quarter of all the specimens accumulated for this study eventually proved to be *A. popeanellus*, and the number of specimens available for study has made it advisable to reduce the distributional data for this common species simply to the localities and months of occurrence:

ALABAMA: Gurley (July); Huntsville (July); Valley Head (Aug.). ARIZONA: Chiricahua Mountains (July); Douglas (Aug.); San Bernardino Ranch, Cochise Co. (Aug.); Tombstone (Aug.); Tucson (July). ARKANSAS: Camp Chaffee (Aug.); Hope (Aug.). FLORIDA: Key Largo (Aug.); Sanford (June); Winter Park (May, June). GEORGIA: Bainbridge (Sept.); Catoosa Co. (Aug.); Clarke Co. (Aug.); Screven Co. (July, an unusually small ♀); Tallapoosa (July). ILLINOIS: Champaign-Urbana (June and July, both sexes very common at light); Dubois (July); Havana (June); Homer Park, Homer (June, July); Lawrenceville (Sept.); Murphysboro (Aug.); Oakwood (July); Palos Park (July); Parker (July). Peoria (June, July); Putnam County (June, July, Aug.); Quincy (June). INDIANA: Putnamville (July); Tremont (June). IOWA: Denison (June); Des Moines (July, Aug.); Linn Co. (no date); Sioux City (June, July). KANSAS: Barton County (June); Bourbon Co. (no date); Caldwell (May, June, Aug.); Clark Co. (May, June); Decatur Co. (July); Douglas Co. (June and July, 2 ♂♂ with mites on abdomen); Gove Co. (no date); Linn Co. (no date); Manhattan (June); Medora (June); Ness Co. (July); Onaga (July); Republic Co. (July); Riley Co. (July); Scott City (June); Scott Co. (June, 1 ♂ with mite on eye); Sheridan Co. (no date); Topeka (no date). KENTUCKY: Harrodsburg (Aug.). MISSISSIPPI: Starkville (July); A. & M. College, State College (Aug.). MISSOURI: Brentwood (June); Kirkwood (May, June, July); Mineola (July); Ranken (June); St. Louis (July); Webster Groves (July); Willard (June). NEBRASKA: Lincoln (June, July, Aug.). NEW JERSEY: Vineland (no date). NEW MEXICO: Artesia (July); Carlsbad Caves, Carlsbad (July); Chaves Co. (July); Deming (July); Eddy Co. (July); Las Cruces (Aug.); Lordsburg (Aug.); Mesilla (July); State

College (July, Aug., Sept.). North Carolina: Hickory (July, Aug.); Kinston (Aug.); Maxton (May); Raleigh (June, July, Aug., Sept.); Wilkesboro (Aug.). Ohio: Granville (July). Oklahoma: Bartlesville (July); Clinton (June); Eagletown (June). Pennsylvania: Finleyville (July); Manoa, Delaware Co. (July). South Carolina: Myrtle Beach (June, July). Tennessee: Memphis (Aug.); Monteagle (July, Aug.); Nashville (July). Texas: Brownsville (June); Burnet Co. (July); Christoval (June); College Station (Oct.); Comfort (May, Sept.); Corpus Christi (Sept., Oct.); Davis Mountains (Aug.); Devils River, near Del Rio (May); Eastland Co. (April); Kingsville (June); Marathon (July); New Braunfels (May); Palo Duro State Park, Randall Co. (Aug.); Richmond (June); San Angelo (June). Virginia: Salem (Aug.).

Remarks.—*A. popeanellus*, one of the first three acrolophids described from the United States, is undoubtedly our commonest and most widely distributed species and is one of the larger and more robust acrolophids occurring in North America. It also exhibits considerable variation in size and coloration. These four factors explain why *popeanellus* is also the most heavily synonymized North American acrolophid.

A. popeanellus is closely related to *klotsi*, the two comprising a small species group in general related to those acrolophids having elongate labial palpi, setose eyes, laminate antennae, bifid uncus, and paired gnathos. However, *popeanellus* and *klotsi* may be distinguished from each other and from all other acrolophids on the basis of their aedeagi and unci. The latter organ, in the *popeanellus-klotsi* group, is distinctive in having its furcae abruptly directed or curved very strongly ventrad. In *popeanellus*, these furcae, easily observable in dried and undissected specimens, are characteristically expanded into subtriangular plates. The genital characters of *popeanellus* are consistent throughout my very large series and they are quite distinct from those of all the other species treated here.

I have not examined the type specimens of this species. Busck (1903), in his report on Clemens' types of Tineina in the Academy of Natural Sciences of Philadelphia, noted:

> *Anaphora popeanella* Clemens. Two types, both rubbed, one unspread and without abdomen; the other spread, and lacking the head and left wings. Clemens' No. 11; alar exp., 28 mm. Like the present conception of *Anaphora popeanella*, as determined by Walsingham and synonymous with *scardina* Zeller, and with *agrotipennella* Grote. A specimen compared with the type is in the U.S. National Museum. Habitat: Eastern United States.

Darlington located one of these type specimens at Philadelphia, and described it (in litt., 1946) as: "*popeanella* Clem. Type. Right wings only, poor condition, much rubbed, sex not determined." The combined information that I have been able to gather in regard to *popeanellus* leaves no doubt in my mind as to the proper identity and correct concept of this species. The specimens of *popeanellus* in the U.S. National Museum agree with my previous concept of this moth. In

addition, at the Museum are several slide preparations of ♂ genitalia, labeled "*popeanellus* Clem.," agreeing with my figures of this species.

Clemens apparently named this moth after Captain Pope. Walsingham (1887, pp. 155–156) designated this species as the type of Clemens' genus, *Anaphora*, and ten years later (1897) reported that the larvae of *popeanellus* attack the roots of *Trifolium pratense* in April and May, and that this insect also occurs in the West Indies (Puerto Rico).

Grote described the ♂ of *Anaphora agrotipennella* as a new species in July 1872. The locality given was "Central Alabama" where Grote reported the moth to be very common in June and July. An alar expanse of 27 mm. was listed.

Following the description Grote stated:

> I have only seen males of this species, in which the ornamentation of the fore wings above recalls that of various species of *Agrotis*, such as *A. jaculifera*, etc. I have tried to recognize in this species *A. Popeanella*, Clemens, from Texas, but I have failed to reconcile his description with my specimens, which are not "luteous or yellow along inner margin." In *A. agrotipennella*, at the extremity of the median ochrey shade subterminally, are a few black scale points. These can hardly be the same as the row "of dark brown spots" of *Popeanella*. Neither can I, from the description, consider the differences of colour and ornamentation as produced by any defect in the condition of Dr. Clemens' specimens.

Grote, describing the ♀ of *Anaphora agrotipennella* in August 1872, further attempted to differentiate his species from Clemens' *popeanella*.

When Walsingham (1887) placed it as a synonym of *popeanella*, he stated:

> An examination of my extensive series shows that both varieties belong to the same species. The anal appendages do not differ, and intermediate variations of colouring are noticeable. There can be no doubt that they differ only in the extension of the pale colour of the fold in the direction of the dorsal margin.

Walsingham also added that Zeller had evidently regarded the two as synonymous. Since 1887, *agrotipennella* has been generally treated by writers as a synonym of *popeanellus*, although Barnes & McDunnough (1917) and McDunnough (1939) maintained it as a distinct and valid species in their checklists.

I have not seen the type specimen, which is in the collection of the Academy of Natural Sciences, but Darlington, in 1946, reported it to be in perfect condition.

All the specimens labeled "*agrotipennellus*" that I have ever seen proved, upon examination of their genitalia, to be examples of *popeanellus*. Likewise, there is no indication in Grote's descriptions that his *agrotipennella* could not be *popeanellus*. In addition, there is no North American species available, save *popeanellus*, to represent Grote's descriptions of *agrotipennella*. It thus seems best to consider *agrotipennellus* an old synonym of *popeanellus* (Clemens) with Walsingham receiving the credit for sinking it.

Zeller described *Anaphora scardina* as a questionably new species in 1873. At the conclusion of his discussion of Clemens' genus *Anaphora*, Zeller said of his own series of specimens: "Whether I have Clemens' species among my own before me, I cannot decide with certainty from his descriptions; therefore I am giving the latter under separate names." He then proceeded to describe *scardina* and *bombycina* at considerable length. That Zeller was uncertain of the validity of his species, *scardina*, is evidenced by the fact that immediately beneath its designation at the head of the original description he inserted "? *Popeanella* Clemens" rather than listing it as "n. sp." He gave the "Vaterland" or locality as Texas and Carolina, where *popeanellus* is quite prevalent, and also mentioned that the largest example of all in his collection was from an unknown locality, thus indicating the possibility of a mixture of species. Chambers (1878), following Zeller's note of caution, gave the listing "*A. scardina*, Zell. =? *popeanella*, Clem." Walsingham (1887), after studying Zeller's specimens, placed *scardina* in the synonymy of *popeanella*, where it has since consistently appeared.

However, the type material for *scardina*, now in the British Museum (Natural History), presents a considerably different situation. One of the three photographs furnished by Tams is labeled "*scardina* Zell., type ♂" and easily but inconclusively passes for an adult *popeanellus*. Likewise, a second photograph labeled "*scardina* Zell." represents a ventral view of the complete ♂ genitalia of a specimen which is clearly and unmistakably *popeanellus*. On the other hand, the third photograph, also representing a set of genitalia and labeled "*scardina* Zell., type ♂," certainly does not represent *popeanellus*, nor does it agree with any other known North American species of *Acrolophus*. Hence, it is quite probable that Zeller's *scardina* is actually a valid species of *Acrolophus*, although not referable to *popeanellus* or any other North American species. It also seems fairly certain that Zeller's original series of *scardina* contained at least two species of *Acrolophus:* one, *popeanellus*, from Texas (also the locality of Clemens' original specimens of *popeanellus*) and Carolina; the other, apparently designated by Zeller as the type of *scardina*, from parts unknown. The latter may well be the large example of unknown origin mentioned in Zeller's original description.

Although *scardina* has long been considered an old synonym of *popeanellus*, the type specimen indicates it does not belong to that segment of the genus occurring north of Mexico. The name is spelled *scardinus* to agree grammatically with its present genus, *Acrolophus*.

Walsingham (1887) described *Anaphora morrisoni* as a new species on the basis of two ♂♂ collected in Florida by Herbert Knowles Morrison. The alar expanse given was 18 mm. He apparently

named the species after the collector, who died in 1885. Since 1887, *morrisoni* has consistently appeared in the literature as a distinct species. Walsingham's illustrations of the ♂ genitalia of *morrisoni*, showing the uncus and the cucullus of the harpe in both lateral and dorsal aspects, are essentially the same as his corresponding figures of the ♂ genitalia of *popeanellus*. On the preceding page of his revision, Walsingham had separated the two species as follows:

1. Points of the uncus distinctly separate—*popeanella*.
2. Points of the uncus closely approximate—*morrisoni*.

This difference is easily absorbed in the range of intraspecific variation exhibited by *popeanellus*.

The type ♂ is at the British Museum (Natural History), from which tams has sent two photographs, labeled "*morrisoni* Wals., type ♂." These show, through a dorsal view of the pinned moth and a ventral view of its entire genital capsule, that it is simply a small but typical Floridian specimen of *popeanellus*. Thus, *morrisoni* (Walsingham) should be considered a new synonym of *popeanellus* (Clemens).

Beutenmüller's manuscript name, *Acrolophus confusellus*, first appeared in print in 1891 in Smith's checklist, where it appeared as a valid species. Dyar (1900) referred to the name in Smith's list as "*confusellus*, Beut. (*ined.*)," indicating it was unpublished. In addition, Dyar validated *confusellus* by properly synonymizing it with the older species "*Anaphora popeanella*, Clemens," so that it emerged as *Anaphora confusellus* Dyar. He then, however, treated it as a form, stating:

> The form *confusellus* is smaller than the usual form, the ground colour lighter and more purplish, the dark marks strongly relieved. In genitalia there is no marked difference. The form differs from *popeanella* about as much as *Acrolophus cervinus*, Wals., does from *A. plumifrontellus*, Clem. U.S. Nat. Mus., type No. 405. Georgia (Beutenmüller's type).

It is obvious from the statement that Dyar had Beutenmüller's manuscript type specimen (chirotype) available for study, and it is interesting to note that *confusellus* and *cervinus* actually are synonyms of *popeanellus* and *plumifrontellus*, respectively. In 1903, the combination appeared as a distinct and valid species in Dyar's checklist; presumably, the statement quoted above was now intended to serve as the basis for considering *confusellus* a separate species. Thus, *confusellus* was elevated from chironym to synonym to form to species. Since 1903, *confusellus* has consistently appeared in the literature as a distinct species. Forbes (1923, p. 121) listed "*confusellus* Beutenmüller" as a synonym of *popeanellus* but also treated "*confusellus* Dyar" as a separate species.

There is no indication that Beutenmüller actually did publish a description of *confusellus*. He invariably described his new species in

this group under *Acrolophus*, and the combination, *Acrolophus confusellus* Beutenmüller, is not listed in the Zoological Record between the years 1891, when it first appeared in Smith's checklist, and 1886, when Beutenmüller's name first appeared as an author in the Zoological Record.

It is fairly obvious from Dyar's "description" of *confusellus* that it is simply a specimen of *popeanellus*. The type ♂, at the U.S. National Museum, where I was able to examine it, is labeled "*Acrolophus confusella* (Beut.) Dyar, type no. 405, Georgia, Beutenmueller Collection." The genitalia, removed and mounted on a slide by Busck on Oct. 12, 1933, confirm the identity of *confusellus* with *popeanellus*, and this is further confirmed by several slides of ♂ genitalia of "cotypes" of *confusellus* that also proved to be *popeanellus*. Thus, *confusellus* (Dyar) should be considered a new synonym of *popeanellus* (Clemens), Dyar having changed his original and correct placement.

12. *Acrolophus acanthogonus* Meyrick, *incertae sedis*

Acrolophus acanthogona Meyrick, 1919, Exotic Microlep., vol. 2, no. 9, p. 279, Nov.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9571.

Meyrick's original description follows:

Acrolophus acanthogona— ♂. 28 mm. Head, palpi, thorax fuscous; structure of palpi and antennae quite as in *popeanella*. Abdomen light fuscous; genitalia similar to *popeanella*, but angle of uncus furnished with a strong acute-triangular projection, points appressed together throughout, valvae with apex broad, slightly rounded. Forewings elongate, posteriorly somewhat dilated, costa gently arched, apex rounded-obtuse, termen rounded, somewhat oblique; fuscous, irregularly sprinkled dark fuscous; some indistinct small cloudy dark fuscous strigulae along costa; some slight whitish suffusion on fold, and two or three dark fuscous strigulae beneath it towards base; submedian and postmedian spots indicated by some irregular dark fuscous irroration; one or two small indistinct spots of dark fuscous irroration towards termen above middle; a terminal series of small indistinct spots of dark fuscous irroration: cilia fuscous (imperfect). Hindwings dark grey, rather lighter anteriorly; cilia greyish, a darker subbasal shade.

Texas; one specimen. Nearly allied to *popeanella*, but forewings slightly broader posteriorly, more uniformly coloured, and easily distinguished by genitalia.

This species, based on a single ♂ specimen from Texas, is treated here as *incertae sedis*, since no specimen is available for study. The name should be spelled *acanthogonus* to agree grammatically with its genus, *Acrolophus*. Mr. Tams of the British Museum (Natural History), where the type is located, originally sent photographs of both this moth and its genitalia. Later, when Dr. J. F. Gates Clarke of the U.S. National Museum studied Meyrick's types at the British Museum (Natural History), the genitalia of *acanthogonus* were remounted and again photographed in clearer detail. Dr. Clarke loaned two photographs of *acanthogonus*, one showing the genitalia in ventral aspect,

the other showing the aedeagus which by then had been removed and photographed separately. These four photographs and the original description represent all of the information that I have been able to gather regarding this species.

Following his description, Meyrick noted that *acanthogonus* is "nearly allied" to *popeanellus* (Clemens), also described from Texas. Actually, there is little in Meyrick's description which could with certainty be used to separate the two species. All of the distinctions he makes easily fall within the considerable range of intraspecific variation that I have observed in *popeanellus*. In addition, the photograph of the adult is inconclusive and could easily represent an example of *popeanellus*.

However, the photographs of the genitalia indicate that although *acanthogonus* is very closely related to *popeanellus*, it is apparently a distinct species. The chief differences lie in the structure of the aedeagus which, in *acanthogonus*, is rather elongate, slender, and almost entirely unexpanded at the base. Its vesica appears to be unarmed and lacks the basal and apical clusters of cornuti so prominent and characteristic in *popeanellus*. In addition, the cucullus of the harpe is shorter, broader, and more expanded in the apical portion than it is in *popeanellus*. Lastly, the furcae of the uncus are more prominently expanded dorsocaudad than in most of the examples of *popeanellus* that I have seen. Thus, *acanthogonus* appears to be distinct.

I have been unable to locate any specimens with genitalia comparable to those shown in the photographs representing *acanthogonus*. I have numerous specimens of *popeanellus* from Texas, but no example of *acanthogonus* is among them, since dissections of these specimens have consistently revealed the typical aedeagus of *popeanellus*. Because the material available seems hardly sufficient for making a proper diagnosis of *acanthogonus*, I must remain uncertain of its identity and proper position. It undoubtedly belongs to the *popeanellus* species group and, on the basis of its external features and uncus, would emerge with *popeanellus* at the same point in my key. It could then presumably be separated from *popeanellus* by means of its aedeagus. Perhaps, like *Acrolophus fervidus* Busck, it is predominantly a Mexican species occurring only infrequently north of the Rio Grande.

13. *Acrolophus klotsi*, new species

FIGURES 65–69

MALE.—Coloration and external structures generally similar to those of *popeanellus*. Head, antennae, and thorax ochreous. Labial palpi elongate, recurved back over head and extending almost to posterior margin of thorax, densely clothed with scales, basal portions

closely appressed to head and to each other, apical portions gradually diverging from thorax and from each other, inner surfaces ochreous, outer surfaces becoming progressively fuscous basad, central and apical segments plumose and fringed with grayish-white distad. Eyes moderately large and protruding, setose, without lashes. Antennae simple, laminate, covered dorsad with scales, segmental processes set closely together throughout antennae. Forewings with coloration quite variable, commonly rich brown with diffused luteous patches below fold and in apical third. Hindwings, fringes, and abdomen varying shades of brown. Wing expanse: 22 to 30 mm.

Female.—Coloration variable as in ♂, color pattern comparatively reduced. Labial palpi short, porrect, densely clothed with scales, basal and central portions closely appressed, apical portions divergent, inner surfaces ochreous, outer surfaces suffused with fuscous. Eyes essentially same as those of ♂. Antennae similar to those of ♂ except more slender and covered dorsolaterad with scales. Forewings variable in coloration, commonly brown with luteous patches as in ♂, commonly dark brown to pale brown with little or no color pattern. Hindwings, fringes, and abdomen dark brown to pale brown. Wing expanse: 30 to 38 mm.

Male genitalia.—Vinculum typical.

Tegumen with lateral arm broad, narrowing considerably toward base, mesal portion punctate; dorsal area broad, mesal portion glabrous.

Harpe simple. Lateral aspect: sublinear, broadest in central area. Costa and sacculus fused, broad, comprising basal half of harpe, glabrous except for heavily punctate and setose ventrocaudal margin of sacculus, narrowing gradually to base. Cucullus set off from costa and sacculus by constrictions and areas of reduced sclerotization, comprising apical half of harpe, heavily punctate except for glabrous dorsal area along basal two-thirds, basal portion slightly constricted; apex somewhat narrowed, rounded.

Transtilla with arm typical; sinuate, glabrous, approximately two-sevenths as long as harpe, terminating above base of harpe.

Uncus bifid. Dorsal aspect: base with deeply emarginate cephalic margin occupied by large and subtriangular caudal extension of tegumen, lateral areas punctate, lateral margins sublinear and convergent; angle of bifurcation very narrow, acute; furcae rather short, robust (but not laterally flattened), narrowly separated, slightly divergent, gradually narrowing distad, directed strongly ventrad, apices acute.

Gnathos paired, typical; arms rather narrow, directed ventrocaudad, well sclerotized, apical thirds minutely scobinate and overlapping, apices rounded.

Anellus large, membranous but slightly thickened, glabrous, juxta absent.

Aedeagus rather short and stout, asymmetrical, glabrous, slightly sinuate, base expanded circularly, basal two-fifths cylindrical; apical three-fifths consisting simply of narrow, well sclerotized, sinistral projection gently curving ventrad and narrowing to acute apex; base of this projection marked by prominent, nodelike expansion of left wall of aedeagus as seen in dorsal and ventral aspects.

Vesica large, membranous, extending slightly beyond sinistral projection of aedeagus, dextral surface armed with single large cornutus. Cornutus arising from mesal portion of vesica, extending caudad almost to apex of vesica, elongate, slender, heavily sclerotized, base slightly expanded, apex acute.

TYPE.—Holotype ♂ and allotype ♀ (type no. 61436) in the U.S. National Museum.

PARATYPES (74 ♂♂, 11 ♀♀).—American Museum of Natural History (24 ♂♂, 3 ♀♀); California Academy of Sciences (37 ♂♂, 6 ♀♀); Cornell University (4 ♂♂, 2 ♀♀); U.S. National Museum (3 ♂♂); University of Arizona (Agr. Exp. Sta.) (2 ♂♂); University of Kansas (4 ♂♂).

TYPE LOCALITY.—Tucson, Pima Co., Ariz. (July 20, E. A. Schwarz).

DISTRIBUTION.—Southwestern United States. Arizona and (?) New Mexico.

SPECIMENS EXAMINED.—87 (75 ♂♂, 12 ♀♀), from 8 localities:

ARIZONA: "Babaquivera" Mts., Pima Co., ♂ (Aug., collector unknown); Baboquivari Mts., Pima Co., 2 ♂♂ (July 15–30, 1924, O. C. Poling); Badger, Santa Cruz Co., 13 ♂♂ (July 31, 1924, E. P. Van Duzee and J. O. Martin); Douglas, Cochise Co., 2 ♂♂ (Aug., F. H. Snow); Patagonia, Santa Cruz Co., 14 ♂♂, 2 ♀♀ (Aug. 1–2, 1924, 2 ♂♂ with mites on abdomen, E. P. Van Duzee); Santa Catalina Mts., ♂ (Sabino Canyon, Aug. 12, 1924, E. P. Van Duzee); Santa Cruz Co., ♂ (Aug. 4, 1927, R. H. Beamer); Tucson, ♂, ♀ (July 20, E.A. Schwarz), ♂ (July 22, 1917, coll. unknown), 9 ♂♂, 4 ♀♀ (St. Xavier Monument, July 29, 1924, E. P. Van Duzee), ♂ (July 25, 1925, at light, 2400 feet, R. B. Streets), ♂ (Aug. 1, 1925, at light, 2400 feet, A. A. Nichol), 8 ♂♂ (July 30, 1937, one specimen with mite on antenna, A. B. Klots), 3 ♂♂, 2 ♀♀ (Oct. 8–10, 1939, Crandall), 16 ♂♂, 3 ♀♀ (July 19 to Aug. 3, 1943, Coll. Fred H. Rindge). NEW MEXICO: Santa Cruz, Santa Fe Co., ♂ (Aug. 20, 1927, R. H. Beamer) (this locality record may possibly be in error).

REMARKS.—The locality records show that this species has been recorded almost exclusively from southern Arizona, where it is quite abundant in the vicinity of Tucson and other parts of Pima County and ranges southward into Mexico. It is one of the larger and more robust acrolophids. *A. klotsi* has not been previously described, probably because of its marked but superficial resemblance to *popeanellus* which also occurs in Tucson and other sections of Arizona.

A. klotsi is related to *popeanellus*, the two comprising a small species group characterized in the foregoing remarks on *popeanellus*. These two species may be easily distinguished from each other, as well as from all other acrolophids, on the basis of their aedeagi and unci. In *klotsi*, the vesica of the aedeagus is armed with only one large cornutus as compared with the two large clusters of cornuti in the vesica of *popeanellus*. Likewise, in *klotsi*, the furcae of the uncus, although curving strongly ventrad, are neither expanded nor flattened like those of *popeanellus*. Lastly, the labial palpi of *klotsi* are somewhat shorter than those of *popeanellus*. The genital characters of *klotsi* are consistent throughout my fairly large series and they are quite distinct from those of all the other species treated here.

This species is named in honor of Dr. Alexander B. Klots, Research Associate in the Department of Insects and Spiders at the American Museum of Natural History. Dr. Klots has supplied me with a large series of acrolophids, which included representatives of a number of new species.

14. *Acrolophus propinquus* (Walsingham)

FIGURES 70–82

Anaphora propinqua Walsingham, 1887, Trans. Ent. Soc. London, p. 157, June.—Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5060.—Dyar, 1900, Can. Ent., vol. 32, no. 11, p. 327; 1903, List North Amer. Lep., p. 578, no. 6591.

Anaphora tenuis Walsingham, 1887, Trans. Ent. Soc. London, p. 164, pl. 8, fig. 18, June.—Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5062.—Dyar, 1900, Can. Ent., vol. 32, no. 11, pp. 326–327; 1903, List North Amer. Lep., p. 579, no. 6595. (New synonymy.)

Acrolophus violaceellus Beutenmüller, 1887, Ent. Amer., vol. 3, no. 7, p. 139, Oct.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5055.—Dyar, 1900, Can. Ent., vol. 32, no. 10, pp. 308–309; 1900, Can. Ent., vol. 32, no. 11, 326 (syn.).—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8186 (syn.).—Forbes, 1923, Lep. New York, p. 121 (syn.).—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9576 (syn.). (New synonymy.)

Anaphora violaceellus Dyar, 1903, List North Amer. Lep., p. 579, no. 6595 (syn.).

Anaphora busckella (♀) Haimbach, 1915, Ent. News, vol. 26, no. 7, p. 325, pl. 12, fig. 11, July. (New synonymy.)

Acrolophus propinquus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8181.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9567.

Acrolophus busckellus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8183.—Forbes, 1923, Lep. New York, p. 121 (syn. ?).—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9569.

Acrolophus tenuis Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8186.—Forbes, 1923, Lep. New York, pp. 120–121.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9576.

Walsingham's original description follows:

Anaphora propinqua—*Palpi* recurved, reaching to the posterior margin of the thorax, purplish fuscous. *Antennae* cinereous, stout, serrated, the ends of the articles being fringed with delicate hairs. *Head, thorax,* and *fore wings* purplish fuscous, the latter without conspicuous markings, the usual discal and apical spots being indicated by dark fuscous scales; no ferruginous shade on fold or disc; a few irregularly distributed white scales, single or in groups of two to four, are noticeable on the outer portion of the wing and on the end of the fold; these appear to be loosely attached and very fugitive; apical vein not forked. *Hind wings* greyish fuscous-cinereous. *Abdomen* purplish fuscous; the lateral claspers of much the same form as in *morrisoni.* The uncus is double, arched over, not angulated, and with the points closely approximate; differing very decidedly in form from that of *morrisoni,* from which species the whole insect is otherwise scarcely distinguishable. *Exp. al.* 18 mm.

Florida (Morrison); two males.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen with lateral arm of medium length, broad, basal portion glabrous, becoming rather heavily punctate dorsocaudad, margins heavily sclerotized and sinuate, strongly narrowing to point of attachment with vinculum; dorsal area broad, punctate laterad, with cephalic margin deeply but narrowly emarginate mesad, caudal margin produced mesad into and fusing with base of uncus.

Harpe simple, somewhat variable. Lateral aspect: rather broad, sublinear to curving slightly ventrad, with slight to pronounced ventral constriction near center; costa and sacculus fused, comprising approximate basal half of harpe; glabrous except for heavily punctate and setose, considerably expanded, ventrocaudal margin of sacculus; broadest in apical third, approximate basal two-thirds irregularly narrowing basad to subacute basal extremity; cucullus partially set off from costa and sacculus by irregular areas of reduced sclerotization, comprising apical half of harpe, rather broad, apical half commonly broader than basal half, heavily punctate and setose ectad and entad except for glabrous dorsal portion of basal two-thirds, apex broad and evenly rounded to narrowed and narrowly rounded.

Transtilla with arm variable, of medium width and length, well sclerotized, glabrous, sublinear to sinuate, major basal portion slightly convergent with to slightly divergent from dorsal margin of costa, approximate apical third strongly converging with to strongly diverging from costa, terminating subacutely to acutely considerably distad of basal extremity of harpe.

Uncus bifid, occasionally asymmetrically so, figure 77. Dorsal aspect: base rather large, partially set off from tegumen by areas of reduced sclerotization; heavily punctate and setose except for small, glabrous, mesobasal area; lateral margins heavily sclerotized, sinuate,

weakly converging distad; angle of bifurcation rather narrow to rather broad; furcae rather short, of medium width, tubular, well sclerotized, heavily punctate and setose, rather broadly separated, diverging distad, curving ventrad and gradually narrowing to acute apices.

Gnathos typically paired, with lateral and apical portions heavily sclerotized, curving ventrocaudad; arms rather broad, flattened, finely scobinate entad, apical portions parallel to partially overlapping, apices broadly and evenly rounded.

Anellus membranous, unarmed or with very weakly sclerotized medioventral area possibly representing trace of juxta.

Aedeagus rather small and slender, approximately two-thirds as long as harpe, asymmetrical and somewhat sinuate in all aspects, glabrous, base weakly expanded laterad and emarginate ventrad, approximate basal half cylindrical, apical half opening broadly dextrad and consisting simply of well sclerotized sinistral wall, apex narrowly rounded to subacute.

Vesica large, membranous, usually unarmed; occasionally armed in central or dextral portion with one to at least five, extremely small, variously shaped, acute cornuti.

Type.—Type ♂ in the British Museum (Natural History).

Type locality.—"Florida."

Distribution.—Central and eastern United States. Missouri and Arkansas eastward to Massachusetts and Florida.

Specimens examined.—156, from 43 localities. The large number of specimens available for study has made it advisable to reduce the distributional data for this fairly common species largely to the localities and months of occurrence:

Alabama: La Place, near Tuskegee (June); Leroy (June). Arkansas: Camden (June). Florida: Fort Myers (April); Gainesville (June & July, traplight); Lake Placid (July, Archbold Biological Station); Merritt Island (Sept.); Okeelanta (May); Orlando (June, at light); Punta Gorda (April); Winter Park (May, June, July). Georgia: (?) Chessar's Island (June); Clayton (May, 2000 feet); Rabun Co. (June); Screven Co. (July); Spring Creek, Decatur Co. (June). Illinois: Champaign-Urbana (June and July, both sexes frequent at light in June); Chicago (June, July); Dubois (July, at light); Edgebrook (June); Homer Park, Homer (June, at light); Mahomet (July, 2 ♂♂ "at sugar"); Palos Park (July, at light); Peoria (June, at light); Putnam County (June). Indiana: Hessville (June, July). Massachusetts: Nantucket ("July 12–28," "Aug.1–Sept. 15"). Mississippi: Biloxi (June); Lucedale (June). Missouri: Kirkwood (June, July); Mineola (July); St. Louis (June). New Jersey: Browns Mills (June, July); Lakehurst (July); Lakewood (July). North Carolina: Brevard (June); Maxton (May and Sept., 1 ♂ with mites on abdomen, 1 ♂ with uncus abnormally broadened); Raleigh (June); Smokemont (June). Ohio: Granville (July). Pennsylvania: Finleyville (June); Wall (no date). South Carolina: Myrtle Beach (June, July).

Remarks.—In addition to being widely distributed and fairly common, *propinquus* exhibits marked variation in size and coloration. These factors undoubtedly account for its relatively large synonymy. The material representing this species was received on loan from numerous sources. Good series containing both sexes are to be found in the collections of the author, the American Museum of Natural History, and Cornell University.

Although not closely related to any other acrolophid, *propinquus* is related to those species having elongate labial palpi, setose eyes, laminate antennae, bifid uncus, and paired gnathos. The harpe and the base of the uncus exhibit the most variation. However, the aedeagus of *propinquus* has proved to be relatively uniform. Thus, the characters to be found in the genitalia of *propinquus* are sufficiently distinct from those of all other acrolophids treated in this work. The variations exhibited by this species may indicate that it is in the process of speciation.

Photographs from Tams labeled "*propinquus* Wals., type" show the adult ♂ and its genitalia. These photographs easily confirm the identity of this species. Several slides of ♂ genitalia labeled "*propinquus* Wlsm." are in the U.S. National Museum. Upon examination of these, I found that they agreed with my concept of this species.

In his revision of 1887, Walsingham described *Anaphora propinqua* and *Anaphora tenuis* as new species on pages 157 and 164 respectively. He based his description of *tenuis* on seven ♂♂ collected in North Carolina by Morrison and a single ♂ without locality in Zeller's collection. The alar expanse for *tenuis* was listed as 24 mm. Walsingham's illustrations of the ♂ genitalia of *tenuis* showed the uncus and the cucullus of the harpe in lateral aspect and the uncus alone in dorsal aspect. Since 1887, *tenuis* has appeared in the literature as a distinct species.

Actually, there is nothing in the description and illustrations of *tenuis* to indicate that it could not be *propinquus*. On page 157 of his revision, Walsingham, in his key to the species of *Anaphora*, separated the two essentially as follows:

a. With supplementary processes on each side of the uncus . . *tenuis*, Wlsm.
b. Without supplementary processes on each side of the uncus . *propinqua*, Wlsm.

The "character" used above by Walsingham is neither consistent nor of specific value. The lateral portions of the base of the uncus may vary considerably within a series of specimens of almost any one species, especially in the case of dried specimens.

The type ♂♂ of both *tenuis* and *propinquus* are at the British Museum. Photographs representing these types sent me by Mr. Tams show moths in dorsal aspect and their complete genital capsules in ventral aspect. These two sets of photographs undoubtedly

represent a single species. Thus, *tenuis* (Walsingham) should be considered a new synonym of *propinquus* (Walsingham), the difference in priority being seven pages of Walsingham's text.

Beutenmüller described *A. violaceellus* as a new species in 1887 only a few months after Walsingham had described *Anaphora propinqua* and *Anaphora tenuis*. Following his description of *violaceellus*, Beutenmüller noted: "Expanse of wings, ♂ 26 mm., ♀ 34 mm. 4 ♂ and 1 ♀. North Carolina. This species can be at once distinguished by its plain color, and violet reflection."

Smith (1891) included *Acrolophus violaceellus* as a distinct species in his check list. Dyar (1900, p. 309) at first related *violaceellus* with *arizonellus* when he said of the former: "The genitalia are not very different from those of *Arizonellus*, Wals., though the harpes may be somewhat slenderer. However, the moth differs in its uniform, unspotted, purplish colour." Shortly thereafter, Dyar (1900, p. 326) correctly placed *violaceellus* as a synonym of *tenuis* in stating: "In Can. Ent., XXXII., 309, I placed *Acrolophus violaceellus*, Beut., as a distinct species, but on further comparison I cannot distinguish it from *Anaphora tenuis*, Wals."

Since 1900, *violaceellus* has consistently appeared in the literature as a synonym of *tenuis*, which in turn I find is a synonym of *Acrolophus propinquus* (Walsingham).

Many of the specimens in my series of *propinquus* easily agree with Beutenmüller's original description of *violaceellus*. The type ♂ is at the U.S. National Museum and is labeled "*Acrolophus violaceellus* Beut., type no. 404, North Carolina, Beutenmueller Collection." It proved, upon examination, to be a typical specimen of *propinquus*. Thus, *violaceellus* Beutenmüller should be considered an old synonym of *tenuis*, with credit to Dyar, and a new synonym of *propinquus* (Walsingham).

Haimbach described the ♀ of *Anaphora busckella* as a new species in 1915. The single figure cited represented a dorsal view of the type specimen which was listed as retained in the author's collection. Haimbach's brief description is as follows:

> Alar expanse 33 mm. Primaries dark brown, with a violaceous tinge, a broad white stripe, also violaceous, at interior margin, speckled with dark brown irrorate spots. There are several blackish spots above the light stripe, the centre one of which partly covers the light stripe. Secondaries and cilia dark smoky brown. Undersides of wings uniformly dark smoky brown, without any ornamentation. One female taken at Jamesburg, New Jersey, July 4th. I am pleased to dedicate this distinct species to Mr. A. Busck, who kindly determined the genus for me, and in many other determinations gave me valuable assistance.

Since 1915, *busckellus* has appeared in the literature as a distinct species, although Forbes (1923), reporting it from Brown's Mills, New Jersey, incorrectly believed it to be a "black aberration" of

popeanellus. I have not seen the type ♀ which is now in the collection of the Academy of Natural Sciences in Philadelphia. Darlington (in litt., 1946) has reported: "*busckellus* Haim. Type. In perfect condition, unable to determine sex."

Haimbach's description and photograph are identical with a small series of specimens I have received from New Jersey (including Forbes' specimens from Brown's Mills), Georgia, and Alabama. The genitalia of these moths are identical with those of my large series of specimens previously determined as *A. propinquus* (Walsingham). The latter species has a wide range in the eastern United States with a number of rather striking geographical variations in both size and color pattern, although these invariably present essentially the same genital structure. *A. propinquus* has been described as new at least four times from North America, with *busckellus* (♀) (Haimbach) as its most recent synonym and perhaps its most striking color variation.

15. *Acrolophus macrogaster* (Walsingham)

In the southwestern United States three groups of moths exhibit essentially the same genital structure (see following description and illustrations) as shown in my copy of a British Museum photograph of genitalia labeled "*macrogaster* Wals., type ♂," described from Arizona. Their genitalia also agree with Walsingham's rather brief diagnosis of the ♂ genitalia in his original description of *macrogaster*. Despite this great similarity of genitalia throughout the complex, the three groups may be easily separated from one another, as well as from Walsingham's original conception of *macrogaster*, by external differences occurring in the antennae, labial palpi, and eyes. On the basis of limited material available for study, these differences among the structures of the head appear to be both nonintergrading and geographical in nature, thus indicating the presence of four subspecies. Three of these are described below as new under the names *bipectinicornus*, *unipectinicornus*, and *laminicornus*, names derived from the type of antennal structure peculiar to each of the subspecies.

According to the original description, Walsingham's ♂ *macrogaster* has a combination of the genitalia described below, bipectinate antennae, and labial palpi which are recurved, elongate, and "reaching nearly to the posterior edge of the thorax." However, I have seen no specimen with this combination of characters.

A unique ♂ specimen, *bipectinicornus*, from the U.S. National Museum, labeled "Colora'o, N.M., at light, July 10 (Ckll.) B 59," perhaps represents the closest approach I have seen to Walsingham's *macrogaster*. This specimen also has strongly bipectinate antennae, although the pectinations are not "wider at their bases than outwardly" as stated in his description. In addition, the labial palpi

of the New Mexican *bipectinicornus* are intermediate in length and extend only onto the anterior margin of the thorax. The basal segment is slightly longer than the central segment, while the apical segment is considerably reduced and less than two-thirds as long as the central segment. The eyes are not setose in *bipectinicornus*.

The two remaining subspecies, *unipectinicornus* and *laminicornus*, are similar to *macrogaster* except that their antennae are either unipectinate or laminate but never bipectinate. They may be distinguished from the New Mexican subspecies, *bipectinicornus*, in three ways: they lack bipectinate antennae; their eyes are obviously setose; and their labial palpi are longer and exhibit an apical segment longer than either the basal or central segments.

These last two subspecies may be separated from each other by their antennal structure. One, *unipectinicornus*, represented by four ♂♂ from Paradise and Douglas, Arizona, exhibits distinctly unipectinate antennae. The other, *laminicornus*, apparently the most prevalent of all and represented by thirteen ♂♂ and one ♀ from Tucson, Badger, and Patagonia, Arizona, has simple, laminate antennae.

The genitalia of *unipectinicornus* and *laminicornus* are essentially the same; the differences between the two subspecies are no greater than the variation exhibited within either one. The genitalia of the unique specimen from New Mexico, *bipectinicornus*, differ from the above in that the gnathos is considerably broader and is not cleft at the apex, and the central portion of the uncus and the cucullus of the harpe are noticeably broader in lateral aspect. The British Museum photograph of the ♂ genitalia of *macrogaster* is not in sufficient detail to show any appreciable differences between that subspecies and the three available for study.

The members of this complex show considerable variation in size and color pattern. The characteristic whitish patch on the posterior margin or "fold" of the forewing is usually present but varies in size and shape. It is sometimes greatly reduced, however, and is almost obsolete in *bipectinicornus*. Further collecting may show that geographical separation does not exist between two or more of these subspecies, thus reducing them to forms. Additional material may also show complete intergradation between two or more of the subspecies, thus reducing them to synonyms.

Key to Subspecies of the *A. macrogaster* Complex

(Based on Males)

1. Antennae bipectinate 2
   Antennae unipectinate or laminate 3

2. Labial palpi elongate, extending almost to posterior margin of thorax; antennae with pectinations wider at bases than outwardly.
macrogaster (Walsingham)

Labial palpi of intermediate length, extending only onto anterior margin of thorax; antennae with pectinations narrower at bases than outwardly.
bipectinicornus, new subspecies

3. Antennae unipectinate . . . . . **unipectinicornus,** new subspecies
Antennae laminate . . . . . **laminicornus,** new subspecies

15a. *Acrolophus macrogaster macrogaster* (Walsingham), new combination

Anaphora macrogaster Walsingham, 1887, Trans. Ent. Soc. London, p. 165, pl. 8, figs. 19, 19a, June.—Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5063.—Dyar, 1900, Can. Ent., vol. 32, no. 11, p. 327; 1903, List North Amer. Lep., p. 579, no. 6596.

Acrolophus macrogaster Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8187.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9577.

Walsingham's original description of *macrogaster* is quoted as follows:

Anaphora macrogaster—Labial palpi, ♂, recurved, reaching nearly to the posterior edge of the thorax; ♀ erect, reaching somewhat above the elongate basal joint of the antennae. *Antennae* ♂, bipectinate, the pectinations wider at their bases than outwardly, fringed with short hairs; subochreous; ♀ simple. *Head, thorax,* and *palpi* mottled greyish and brownish fuscous. *Fore wings* brownish fuscous, slightly mottled with paler along the costal and apical margins; with an elongate patch of dull whitish running irregularly along the length of the fold; a smaller spot of the same colour immediately beyond the outer end of the cell. *Hind wings* brown; the fringes scarcely paler. *Abdomen* the same colour as the hind wings, that of the male about 7 mm., of female 10 mm.; the lateral claspers of the male spoon-shaped, scarcely inverted, dilated outwardly, but tapering slightly upwards and rounded at the apex; uncus double, the points parallel and somewhat closely approximate. *Exp. al.* ♂, 22 mm.; ♀, 29 mm.

Three males and three females from Arizona, collected by Morrison.

Male genitalia essentially the same as those of *laminicornus,* described below.

Remarks.—Walsingham's illustrations consisted of: figure 19 the adult ♀, dorsal aspect, in color; and figure 19a the ♂ genitalia—the uncus and cucullus in lateral aspect and the uncus in dorsal aspect. The type material, including both ♂♂ and ♀♀, is in the British Museum (Natural History). Mr. Tams of that institution has sent photographs, labeled "*macrogaster* Wals., type," showing an adult ♂ and ♀ and their genitalia. These, along with the original description, furnish a reasonably complete conception for *macrogaster.* Although I have never seen a specimen completely agreeing with this conception, I am considering this subspecies valid because its genitalia are apparently the same as those of the following three subspecies, which may be distinguished from one another, as well as from

macrogaster, on the basis of differences occurring in the antennae, labial palpi, and eyes.

15b. *Acrolophus macrogaster bipectinicornus*, new subspecies

Female unknown.

MALE.—Similar to *macrogaster* in habitus and general coloration. Labial palpi intermediate in length, closely appressed, recurved, extending only onto anterior margin of thorax, apical portions diverging slightly from head and from each other distad, basal segment slightly longer than central segment, apical segment considerably reduced and less than two-thirds as long as central segment. Eyes rather large and protruding, naked, posterior halves heavily lashed. Antennae strongly bipectinate; pectinations finely setose, narrower at bases than outwardly. Forewings with basal whitish patches almost obsolete. Hindwings pale brown, considerably paler than forewings. Genitalia similar to those of *laminicornus* with following exceptions: gnathos considerably broader, not cleft at apex; cucullus of harpe and central portion of uncus noticeably broader in lateral aspect. Expanse: 19 mm. A unique ♂ specimen from Colora'o, New Mexico, at light, July 10, T. D. A. Cockerell.

Holotype ♂, U.S. National Museum, type no. 61437. This subspecies may be distinguished from the others of the *macrogaster* complex by its combination of bipectinate antennae, from which the name is derived, and shortened labial palpi.

15c. *Acrolophus macrogaster unipectinicornus*, new subspecies

FIGURES 83–84

Female unknown.

MALE.—Similar to *macrogaster* in habitus and general coloration. Labial palpi elongate, recurved, extending to center of thorax, basal portions closely appressed to head and to each other, apical portions diverging from thorax and from each other distad, basal segment shorter than central segment, apical segment elongate and slightly longer than central segment. Eyes rather small, moderately setose, anterior and posterior portions well lashed. Antennae unipectinate; pectinations subcircular, finely setose, each separated from adjacent process by space at least equal to thickness of process. Ground color of forewings, hindwings, and abdomen brown. Abdomen with lateral tufts of whitish scales; tip clothed with elongate, slender, brownish scales. Genitalia, including harpe (fig. 83) and aedeagus (fig. 84), essentially same as those of *laminicornus*. Expanse: 20–23 mm. Four ♂♂ from Arizona.

Holotype ♂, U.S. National Museum, type no. 61438, from Paradise, Cochise Co., Ariz., July. The three remaining ♂♂ have been

designated as paratypes. One, also from Paradise and collected by O. C. Poling in June, was received from the Carnegie Museum. The other two are from the U.S. National Museum. Of these, one is from Douglas, Cochise Co., Ariz., July 1–7. The other, apparently from Lord Walsingham's collection and determined by him, bears a number of labels giving the following information: "♂—136, 1889, Wlsm. Coll.—Morrison, Arizona, 1881—Collection C. V. Riley—*Anaphora macrogaster* Wlsm."

Remarks.—This subspecies may be distinguished from the others of the *macrogaster* complex by its unipectinate antennae, from which the name is derived. A single ♀, received from the University of Kansas and labeled "Douglas, Arizona, August, F. H. Snow," definitely represents one of the subspecies of *macrogaster*. However, it was not collected in conjunction with any of the ♂ specimens I have received for study, and thus can not be positively associated with *unipectinicornus*, also recorded from Douglas. Its external appearance is essentially the same as that of the ♀ of *laminicornus*, described below.

15d. *Acrolophus macrogaster laminicornus*, new subspecies

Figures 85–89

Male.—Similar to *macrogaster* in habitus and general coloration. Labial palpi elongate, recurved, extending somewhat beyond center of thorax; diverging from head, thorax, and from each other distad; basal and central segments approximately equal in length, apical segment slightly longer than either. Eyes rather small, moderately setose, anterior and posterior portions lashed. Antennae simple, laminate; each process finely setose, laterally flattened, narrowly separated from adjacent processes. Ground color of wings and abdomen rich brown. Forewings with whitish patches large, prominent. Tip of abdomen with pair of prominent, lateral tufts; each tuft composed of numerous, elongate, slender, brown and white scales. Expanse: 17–21 mm.

Female.—Similar to ♂ in general coloration. Labial palpi short, closely appressed, basal portions recurved, apical portions porrect. Eyes as in ♂, but less heavily lashed. Antennae as in ♂, but more slender. Tip of abdomen without tufts. Expanse: 28 mm. Thirteen ♂♂ and one ♀ from Pima and Santa Cruz Counties, Arizona.

Male genitalia.—Vinculum distinctive, consisting mostly of ventral plate with caudal margin and laterocephalic extremities broadly and evenly rounded and cephalic margin broadly emarginate.

Tegumen broad, glabrous; lateral arm narrowing to point of articulation with vinculum, margins somewhat sinuate; dorsal area not

emarginate, mesal portion fusing indistinctly caudad with base of uncus.

Harpe simple. Lateral aspect: of medium length, broad, principal parts indistinctly fused, dorsal margin sublinear apicad of dorsal expansion at base of arm of transtilla, ventral margin sinuate, approximate apical third very heavily punctate ectad and entad, approximate central third glabrous except for sparsely punctate and setose dorsal and ventral areas on ental surface, basal portion glabrous and narrowing irregularly basad of point of attachment of arm of transtilla to narrow basal extremity, apex broadly and evenly rounded.

Transtilla with arm glabrous, well sclerotized, linear or sublinear, slightly more than one-fourth to one-third as long as harpe, parallel to or directed somewhat ventrad of longitudinal axis of main portion of harpe, increasingly divergent distad from margin of costa and with apex widely separated from basal extremity of harpe, terminating subacutely slightly to considerably beyond base of harpe.

Uncus bifid. Dorsal aspect: base large, glabrous, mesal portion rather weakly sclerotized; lateral margins heavily sclerotized, linear, evenly converging caudad into furcae; angle of bifurcation rather narrow, evenly rounded. Furcae rather elongate and slender, tubular, very sparsely punctate, evenly curving caudoventrad, rather closely subparallel, apical portions generally slightly convergent, apices acute and narrowly separated.

Gnathos paired but commonly obscurely so, possibly transitional between paired and fused types, directed caudoventrad; basal portion with mesal area broad and membranous, lateral margins heavily sclerotized and converging distad; apical portion well sclerotized, very heavily scobinate, lateral margins converging distad; apex clearly to rather obscurely cleft into two rather short arms with subacute apices.

Anellus membranous, unarmed, juxta absent.

Aedeagus slender, rather short, approximately two-thirds to almost three-fourths as long as harpe, glabrous, cylindrical, somewhat asymmetrical, sublinear in dorsal and ventral aspects, apical and basal portions curving slightly ventrad in lateral aspect; approximate basal fourth evenly expanded, opening broadly ventrad; remainder of aedeagus gradually narrowing to apex; approximate apical half to two-fifths opening lateroventrad, apex acute.

Vesica rather small, elongate, narrow, membranous, unarmed.

Holotype ♂, U.S. National Museum, type no. 61439, from St. Xavier Monument, Tucson, Pima Co., Ariz., August 12, 1924, J. O. Martin. The remaining 12 ♂♂ and 1 ♀, all from the Department of Entomology, California Academy of Sciences, have been designated as paratypes and bear the following data: St. Xavier

Monument, July 29, 1924, 3 ♂♂, J. O. Martin, 2 ♂♂, E. P. Van Duzee, August 12, 2 ♂♂, J. O. Martin; Badger, Santa Cruz Co., Ariz., July 31, 1924, 2 ♂♂, E. P. Van Duzee, 1 ♂ and 1 ♀, J. O. Martin; Patagonia, Santa Cruz Co., Ariz., August 2, 1924, 2 ♂♂, E. P. Van Duzee. This subspecies may be distinguished from the others of the *macrogaster* complex by its laminate antennae, from which the name is derived. The subspecific name, *laminicornus*, is derived from the Latin words lamina, meaning "a thin plate," and cornu, "a horn."

16. *Acrolophus balduſi*, new species

FIGURES 90–94

MALE.—Head, labial palpi, and antennae whitish-ochreous. Labial palpi intermediate in length, recurved back over head and extending onto anterior margin of thorax, diverging rather strongly from head and from each other distad; clothed with very slender, elongate scales. Eyes rather small, sparsely and finely setose, heavily lashed and partially concealed by elongate setae. Antennae strongly unipectinate, covered dorsad with scales; segmental processes large, subcircular, platelike, finely ciliated, rather slender and broadly spaced from one another in lateral aspect. Thorax ochreous tinged with fuscous. Forewings with coloration somewhat variable, ground color grayish-white irregularly sprinkled with fuscous; brownish to fuscous markings in form of short bars along costa, narrow band sharply alternating between gray and brown along apical margin, spot at outer end of cell, and prominent fuscous patch in basal third on and beneath fold. Hindwings brownish, with margins and fringes alternately gray and brown. Legs and abdomen pale brown. Wing expanse: 18 to 22 mm.

FEMALE (association tentative).—General coloration similar to that of ♂ although slightly paler and with pattern less distinct. Labial palpi short, extending only slightly beyond antennal bases, closely appressed to head but well separated from each other, rather sparsely clothed with slender scales. Eyes similar to those of ♂ except less heavily lashed. Antennae simple, covered dorsad by scales, segments globose. Wing expanse: 26 mm.

MALE GENITALIA.—Vinculum atypical, considerably reduced; for most part appearing simply as rather weakly sclerotized, subcircular, ventral plate; areas of fusion with lateral arms of tegumen produced into pair of ventrolateral, subdigitate processes.

Tegumen glabrous, lateral arms very broad, dorsal area very broad and not separated along meson.

Harpe simple. Lateral aspect: major central portion very broad, lacking dorsal and ventral constrictions; costa and sacculus indistinctly fused, greatly reduced, comprising slightly more than basal quarter of harpe, glabrous, broadest in apical portion, approximate basal two-thirds markedly narrowed, basal extremity rather narrowly rounded; cucullus greatly enlarged, comprising slightly less than apical three-fourths of harpe, indistinctly fused with costa and sacculus, heavily punctate and setose ectad and entad except near base, broadest in apical half, dorsal margin weakly sinuate and curving slightly dorsad at base and apex, ventral margin sinuate and with central portion broadly expanded ventrad, approximate apical third strongly narrowing ventrad, apex narrow and directed dorsocaudad, apical extremity rather narrowly rounded.

Transtilla with arm rather long and slender, glabrous, major portion parallel with dorsal margin of costa, terminating subacutely slightly proximad of basal extremity of harpe.

Uncus bifid. Dorsal aspect: base partially separated from tegumen by narrow areas of reduced sclerotization, sparsely punctate; lateral margins heavily sclerotized, weakly sinuate, converging distad; angle of bifurcation rather narrow, rounded; furcae rather elongate and slender, tubular, well sclerotized, glabrous, basal portions rather closely subparallel, apical portions converging distad, major portions directed only slightly ventrad; apices curving strongly ventrad, approximate, acute.

Gnathos fused, in form of well sclerotized flap directed ventrocaudad, rather short and broad, dorsal surface finely but densely scobinate, apex broadly and evenly rounded.

Anellus membranous, unarmed, juxta absent.

Aedeagus rather small, shortened, subconical, asymmetrical, glabrous; in lateral aspect base with subtriangular, ventrocephalic expansion approximately two-thirds as large as remainder of aedeagus; major apical portion gradually tapering distad, apical third narrow and opening dorsad, apex narrowly and irregularly rounded.

Vesica small, membranous, unarmed.

Type.—Holotype ♂ (type no. 61440) in the U.S. National Museum.

Paratypes (9 ♂♂).—Illinois State Natural History Survey (8 ♂♂); U.S. National Museum (1 ♂).

Type locality.—Douglas, Cochise Co., Ariz. (July 1–7, collector unknown).

Distribution.—Southwestern United States. Arizona, New Mexico, and Texas.

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SPECIMENS EXAMINED.—11 (10 ♂♂, 1 ♀), from 4 localities:

ARIZONA: Douglas, Cochise Co., ♂ (July 1–7, collector unknown); Paradise, Cochise Co., ♂ (June, collector unknown). NEW MEXICO: Las Vegas, San Miguel Co., 8 ♂♂ (no date, Andreas Bolter collection). TEXAS: Locality and date unknown, ♀ ("Tex.," Andreas Bolter collection).

REMARKS.—This species undoubtedly ranges southward into Mexico. The single ♀ listed above has been only tentatively associated with *baldufi*. The latter is very closely related to the complex species *macrogaster*, the two comprising a rather unusual species group among the acrolophids, exhibiting great diversity in regard to cephalic structures. The labial palpi may be elongate or shortened, while the eyes may be naked or setose. Further, the antennae may be laminate, unipectinate, or bipectinate. However, the various members of the *macrogaster-baldufi* species group are bound together by their nearly identical genital structures. These include the distinctive combination of a bifid uncus and a fused gnathos. *Acrolophus baldufi* may be easily distinguished from its close relatives by its shortened labial palpi and strongly unipectinate antennae. Likewise, it may be separated from the remaining members of the genus by its characteristic harpe and aedeagus. The genital characters are consistent throughout my rather small series representing *baldufi*.

Acrolophus baldufi exhibits certain affinities with at least two Mexican species in this genus. At the U.S. National Museum there is a slide preparation of the ♂ genitalia of a specimen labeled "*Acrolophus echinon* Druce, Mexico City, Mexico, R. Müller #2075." The genitalia on this slide are quite similar to, although not identical with, those of *baldufi*. Also at the National Museum is a slide preparation of ♂ genitalia labeled "*Acrolophus barbipalpus* Busck, Paratype, Tehuacan, Mexico." The genitalia on this slide are somewhat similar to those of *baldufi*. However, the adults of *barbipalpus*, the type ♂ of which is also at the National Museum, and *baldufi* are externally quite distinct. This species is named in honor of Walter V. Balduf, Professor of Entomology at the University of Illinois.

17. *Acrolophus arizonellus* Walsingham

FIGURES 95–99

Acrolophus arizonellus Walsingham, 1887, Trans. Ent. Soc. London, p. 153, pl. 7, fig. 10, June.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5053.—Dyar, 1900, Can. Ent., vol. 32, no. 10, pp. 308–309; 1903, List North Amer. Lep., p. 578, no. 6588.—Walsingham, 1915, Biol. Cent.-Amer., pt. 12, vol. 4, p. 391.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8174.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9560.

Walsingham's original description follows:

Acrolophus arizonellus—*Palpi*, ♂, recurved, reaching beyond the middle of the thorax; ♀ short, slightly upturned, but scarcely reaching more than the length of the head beyond it. *Antennae* subochreous, rather flattened, simple, having a very slight notched appearance owing to the scales on the upper side being a little raised at the joints. *Head, thorax,* and *palpi* pale brownish, with a slightly hoary appearance from an admixture of grey hairs. *Fore wings* greyish brown, sprinkled with dark brown scales; the costal margin very narrowly subochreous, with about six pairs of ill-defined dark brown dots along it; a conspicuous dark brown spot at the end of the cell and another on the fold at one-third from the base; below this in one specimen is a pale patch; the fringes slightly paler than the wing, but mottled with brown; under side pale brownish, the margins narrowly greyish ochreous. *Hind wings* brown, with pale tips to the fringes; under side pale brownish. *Abdomen*: the long hairy clothing of the base of the abdomen above is pale greyish ochreous, the abdomen itself inclining to brown; lateral claspers elongate, spoon-shaped, curved inwards, tending to form a slight angle at their upper and outward extremity; the uncus double, with the two points very slightly diverging and not widely separated. *Exp. al.* ♂, 25 mm.; ♀, 36 mm.

I have a male and two females from Arizona, collected by the late Mr. Morrison.

Walsingham's illustrations of the ♂ genitalia consisted of the uncus and the cucullus of the harpe in lateral aspect and the uncus in dorsal aspect.

Male genitalia.—Vinculum typical, as in other species.

Tegumen glabrous; lateral arm broad, narrowing toward point of articulation with vinculum; dorsal area broad, not separated along meson.

Harpe simple. Lateral aspect: rather elongate and slender, ventral margin abruptly and deeply emarginate near center to form constricted area of harpe; costa and sacculus indistinctly fused, comprising approximate basal half of harpe, glabrous, dorsal and ventral margins sinuate, broadest in apical third, approximate basal two-thirds abruptly narrowing immediately basad of point of attachment of arm of transtilla to less than half width of apical third, basal half gradually narrowing and curving somewhat dorsad toward rather narrowly rounded basal extremity, ventrocaudal extremity of sacculus prominently angulate; cucullus fairly well set off from costa and sacculus by dorsal and ventral constrictions near base, comprising apical half of harpe, sublinear, heavily punctate and setose except at base, dorsal margin sublinear but commonly becoming serrate toward apex, ventral margin smooth and expanding ventrad, base narrowed, broadest in apical third, apex narrowing ventrad.

Transtilla with arm large, elongate, of medium width, glabrous, rather widely subparallel with dorsal margin of costa, terminating subacutely somewhat distad of basal extremity of harpe.

Uncus bifid. Dorsal aspect: base with lateral areas heavily punctate, lateral margins weakly sinuate and converging distad; angle

of bifurcation subacute to narrowly rounded; furcae of medium length, rather robust, tubular, central portions weakly expanded in lateral aspect, sparsely setose, curving ventrad toward apices, rather closely subparallel; apices slightly divergent, directed ventrad, acute.

Gnathos typically paired, directed ventrocaudad; arms with apices overlapping, glabrous, subacute.

Anellus membranous, unarmed, juxta absent.

Aedeagus of medium length and width, asymmetrical, glabrous; base considerably expanded ventrad and partially opening dextrad, remainder sublinear; approximate basal half cylindrical, apical half opening broadly dextrad, apex narrowly rounded.

Vesica large, membranous, armed along dorsal and apical margins with row of approximately 10–15 cornuti; cornuti minute, acute, closely set, directed distad.

TYPE.—♂ and ♀ types in the British Museum (Natural History).

TYPE LOCALITY.—"Arizona."

DISTRIBUTION.—Southwestern United States. Arizona, New Mexico, and Texas.

SPECIMENS EXAMINED.—48 (41 ♂♂, 7 ♀♀), from 13 localities:

ARIZONA: Baboquivaria Mountains, 2 ♂♂ (no date, F. H. Snow); Huachuca Mountains, ♀ (July 20, 1936, J. N. Knull); McNary, White Mountains, 2 ♂♂ (July 10, 1936, A. B. Klots collection); Nogales, ♂ (Aug. 27, 1906, A. Koebele); Patagonia, 10 ♂♂, ♀ (July 18, 1948, C. & P. Vaurie); Pinal Co., "6 miles south of Florence," ♂ (July 23, 1924, E. P. Van Duzee); San Bernardino Ranch, Cochise Co., 3 ♂♂ (Aug., elevation 3750 feet, F. H. Snow); San Carlos, ♀ (July 11, 1936, "Parker, Lot 306," A. B. Klots collection); Tucson, 5 ♂♂, ♀ (St. Xavier National Monument, July 29, 1924, E. P. Van Duzee and J. O. Martin), ♂, ♀ (July 30, 1937, A. B. Klots), 3 ♂♂ (Oct. 8–10, 1939, Crandall), 2 ♂♂ (July 18 and 29, 1943, Fred H. Rindge collection); Tumacacori National Monument, Santa Cruz Co., 4 ♂♂, ♀ (July 20, 1948, C. & P. Vaurie). NEW MEXICO: State College, 5 ♂♂ (July 8, 1945), ♂ (July 26, 1945). TEXAS: Davis Mountain Junction, Reeves Co., ♂ (July 10, 1948, C. & P. Vaurie); Marathon, ♀ (July 9, 1948, C. & P. Vaurie).

REMARKS.—The material studied for this species was received on loan from six sources. The American Museum of Natural History furnished about half the specimens.

A. arizonellus, which undoubtedly ranges southward into Mexico, is very closely related to *luriei*, the two comprising a small species group. This group is related to those acrolophids having elongate labial palpi, setose eyes, bifid uncus, and paired gnathos. However, *luriei* and *arizonellus* may be distinguished from each other and from the other species treated here on the basis of their harpes and aedeagi. In *arizonellus*, the sacculus of the harpe is strongly angulated at its ventrocaudal extremity, a condition not exhibited by *luriei*. In

addition, the vesica of the aedeagus in *arizonellus* is armed with a single row of minute cornuti as compared with the unarmed vesica of *luriei*. The genital characters of *arizonellus* are quite consistent throughout my series of this species.

Among my specimens representing this species is an atypical ♂, collected along with a series of normal ♂♂ at Patagonia, Ariz., exhibiting abnormal or deformed genitalia. The moth itself is smaller and darker than the typical form and its forewings have a simpler or reduced color pattern. The genital capsule is approximately two-thirds as large as that of the typical form. The furcae of the uncus, although in themselves normally constructed, are widely separated by a very broadly and evenly rounded angle of bifurcation. This condition represents a marked divergence from the normal form of *arizonellus*. Although the harpes of the abnormal specimen are asymmetrical, they exhibit the characteristic angular condition at the ventrocaudal extremity of the sacculus. The left harpe is fairly typical, but the cucullus of the right harpe is unusually narrow, especially so distad, and its ventral margin becomes increasingly dentate distad. The vesica of the aedeagus is armed with only two cornuti, one several times larger than the other, situated near its apex. The cornuti are elongate, slender, and finely acute. Aside from being relatively smaller, the other genital structures, namely the vinculum, tegumen, gnathos, anellus, and aedeagus, seem to be fairly normal in form. To some extent, this atypical specimen represents a transitional form between *arizonellus* and *luriei*.

According to Carl Heinrich (1946, in litt.) the holotype of this species is in the U.S. National Museum. However, I could not locate a holotype for *arizonellus* at that institution in May of 1951. On the other hand, Mr. Tams of the British Museum (Natural History) has sent me photographs labeled "*arizonellus* Wals., type." These photographs show the adult ♂ and ♀ but only the genitalia of the latter. The adults pictured agree well with my specimens representing *arizonellus*. Although a photograph of the ♂ genitalia is not available, Walsingham's illustrations of the ♂ genitalia accompanying his original description of *arizonellus* reasonably confirm the identity of this species. The U.S. National Museum does have several slides of ♂ genitalia labeled "*arizonellus* Wlsm." These agree with my concept of this species.

Dyar (1900) listed the following distributional data for *arizonellus:* "Tucson, Arizona, July 19, 20 and 21 (E. A. Schwarz); Mesilla, New Mexico, June 25 and July 1 (T. D. A. Cockerell)."

18. *Acrolophus luriei*, new species

FIGURES 100–101

MALE.—Somewhat similar to *arizonellus* in general habitus. Head, labial palpi, and antennae luteous. Labial palpi elongate, recurved back over head and extending slightly beyond center of thorax, well clothed with scales but not plumose, basal portions closely appressed to head and to each other, apical portions weakly diverging from thorax and from each other distad. Eyes rather small, weakly protruding, heavily setose, weakly lashed. Antennae simple, laminate, covered dorsad with scales, segmental processes set closely together throughout antennae. Thorax ochreous tinged with black and white. Forewings rich brown sprinkled with bars and spots of darker brown; markings in form of short bars along apical half of costa, small dots along apical margin, large spot at outer end of cell, and diffused patch beneath center of fold; color pattern variable, commonly reduced or almost entirely wanting. Hindwings rich brown, fringes considerably paler. Legs ochreous. Abdomen dark brown. Wing expanse: 19 to 24 mm.

FEMALE.—General coloration similar to that of ♂, pattern variable as in ♂. Labial palpi short, basal portions appressed to head, apical portions strongly diverging from head. Eyes essentially same as those of ♂. Antennae simple, slender, segments completely encircled by scales. Wing expanse: 26 to 29 mm.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen with lateral arm broad, glabrous, gradually narrowing toward point of articulation with vinculum; dorsal area fairly broad, not emarginate along meson, mesocaudal area very finely punctate and indistinctly fusing with base of uncus.

Harpe simple. Lateral aspect: linear, rather elongate and slender. Costa and sacculus fused, glabrous except for sparsely punctate and setose ventrocaudal margin of sacculus, apical half slightly and evenly expanded dorsad and ventrad, basal portion narrowing beneath point of attachment of arm of transtilla to approximately half width of apical portion, without angular formation at ventrocaudal extremity of sacculus. Cucullus rather indistinctly fused with costa and sacculus, comprising approximate apical half of harpe, linear or sublinear, heavily punctate ectad except for dorsal portion of basal two-thirds, base slightly narrowed, expanding slightly toward apex; apex broadly and evenly rounded, margin very finely dentate.

Transtilla with arm glabrous, well sclerotized, rather elongate, sublinear, slightly convergent with costal margin, less than one-third as long as harpe, terminating subacutely near basal extremity of harpe.

Uncus bifid. Dorsal aspect: base with lateral areas heavily punctate, lateral margins very heavily sclerotized and evenly converging caudad into furcae; angle of bifurcation acute, narrow. Furcae fairly robust, tubular, sparsely punctate, evenly curving caudoventrad, basal halves rather closely subparallel, apical halves somewhat divergent distad, apices acute.

Gnathos typically paired, directed mostly ventrad, arms glabrous, apices narrowly rounded and partially overlapping.

Anellus membranous, unarmed, juxta absent.

Aedeagus with length and width medium, approximately two-thirds as long as harpe, cylindrical, asymmetrical; basal fifth somewhat expanded, evenly curving ventrad, opening dorsad; remainder of aedeagus sublinear in all aspects, expanding slightly toward apex; apical half opening broadly dorsodextrad, terminating subacutely, armed with numerous extremely minute spinelike processes.

Vesica large, membranous, unarmed.

TYPE.—Holotype ♂ and allotype ♀ in the California Academy of Sciences.

PARATYPES (10 ♂♂, 1 ♀).—American Museum of Natural History (2 ♂♂); California Academy of Sciences (7 ♂♂, 1 ♀); U.S. National Museum (1 ♂).

TYPE LOCALITY.—Tucson, Pima Co., Ariz. (St. Xavier Monument, July 29, 1924, E. P. Van Duzee).

DISTRIBUTION.—Southwestern United States. Southern Arizona.

SPECIMENS EXAMINED.—15 (11 ♂♂, 4 ♀♀), from one locality:

ARIZONA: Tucson, 9 ♂♂, 4 ♀ ♀ (St. Xavier Monument, July 29, 1924, E. P. Van Duzee and J. O. Martin), ♂ (July 30, 1937, A. B. Klots), ♂ (July 30, 1943, Fred H. Rindge collection).

REMARKS.—This species undoubtedly ranges southward into Mexico. Of the four ♀ ♀ listed above, the allotype and paratype have been associated with the ♂♂ of *luriei* with reasonable certainty, the third ♀ is probably *luriei*, and the fourth possibly belongs to this species.

A. luriei is very closely related to *arizonellus*, the two comprising a small species group which has been characterized in the foregoing remarks on *arizonellus*. Both species are similar in general habitus and genital structure. In addition, a comparison of the locality records reveals that the two have been taken together at Tucson, Ariz., by various collectors. Of the two species, however, *luriei* is generally smaller and darker, its forewings exhibit a simpler or reduced color pattern, and its labial palpi are less heavily clothed with scales. In regard to genital structure, *luriei* differs from *arizonellus* in that the former lacks the angular formation at the ventrocaudal extremity of the sacculus of its harpe and that it also lacks cornuti in the vesica of its aedeagus. Aside from being somewhat smaller, the remaining

genital structures of *luriei*, namely the vinculum, tegumen, arm of the transtilla, uncus, gnathos, anellus, and aedeagus, are essentially the same as those of *arizonellus*. The genital characters of *luriei* are consistent among my examples of this species and they are distinct from those of all other acrolophids treated here. This species is named in memory of Pierre C. Lurie, formerly of Urbana and Chicago, Ill.

19. *Acrolophus maculifer* (Walsingham)

FIGURES 102–106

Eulepiste maculifer Walsingham, 1887, Trans. Ent. Soc. London, p. 143, pl. 7, figs. 1c, 1d, June.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5045.—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 306; 1903, List North Amer. Lep., p. 577, no. 6580.

Acrolophus (*Eulepiste*) *maculifer* Busck, 1912, Rep. Laguna Marine Lab., vol. 1, p. 169.

Acrolophus maculifer Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8164.—Eyer, 1924, Ann. Ent. Soc. Amer., vol. 17, no. 3, p. 328, pl. 35, fig. 5.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9550.

Walsingham's original description follows:

Eulepiste maculifer—Labial palpi, ♂, erect, the first joint thickly scaled beneath, the second and third joints without distinct tufts, brownish fuscous, paler on the inner sides and above. ♀ porrect, the first and second joints clothed with a coarse projecting tuft; the third joint only exposed, slender. *Antennae* brownish, having a spotted appearance owing to thin lines of rather darker raised scales at the joints. *Head* brownish fuscous, tufted above the eyes. *Thorax and fore wings* brownish fuscous, the latter mottled with dark ferruginous and bearing a dingy white spot on the outer half of the fold and a more diffused and ill-defined patch of the same colour on the apical portion of the wing; there are some dull whitish markings in the cilia and before the anal angle; along the costa the brownish fuscous colouring is interrupted by paler and more greyish fuscous before and beyond the middle. *Hind wings* brownish. *Abdomen and hind legs* the same; tarsal joints spotted with fuscous; uncus slightly bent over, double, the points closely approximate; lateral claspers elongate, attenuated posteriorly, oblique at the ends, their upper extremity rather pointed. *Exp. al.* ♂, 20 mm; ♀, 20–24 mm.

Hab. Three males and two females from Arizona (Morrison).

Walsingham's illustrations consisted of (figure 1c) the head of the ♂ in lateral aspect and (figure 1d) the head of the ♀ in lateral aspect.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen with lateral arm weakly constricted near center, narrowing strongly at point of articulation with vinculum, moderately punctate and setose; dorsal area rather narrow, almost completely separated along meson by deep cephalic emargination.

Harpe simple, sublinear. Lateral aspect: costa and sacculus reduced, slender, shortened, comprising approximate basal third of

harpe, indistinctly fused, glabrous except for setose and subdigitate ventrocaudal margin of sacculus, apical portion broadest and expanded somewhat ventrad, basal portion very slender, basal extremity narrowly rounded; cucullus set off from costa and sacculus by dorsal and ventral constrictions and area of reduced sclerotization, large, elongate, broad, heavily punctate and setose ectad and entad and especially so in apical third, apical portion narrowing distad and curving slightly dorsad, apex evenly rounded.

Transtilla with arm rather slender, of medium length, rather widely separated from and subparallel with dorsal margin of costa, glabrous, terminating acutely slightly distad of basal extremity of harpe.

Uncus simple, except at extreme apex. Dorsal aspect: base glabrous, with cephalic margin emarginate mesad; lateral margins heavily sclerotized, sublinear, gradually converging distad into uncal process. Uncal process indistinctly fused with base, concave beneath, gradually narrowing and curving ventrad toward apex; apex sparsely setose and moderately expanded into pair of minute, acute, heavily sclerotized, laterally flattened, divergent processes.

Gnathos fused, reduced, glabrous, well sclerotized especially along lateral margins, thickened dorsoventrad, directed ventrocaudad, apex narrow but evenly rounded.

Anellus large, elongate, membranous, unarmed, juxta absent.

Aedeagus elongate, slender, cylindrical, asymmetrical, nearly glabrous. Lateral aspect: basal two-thirds curving ventrad and caudad through angle of approximately 180° resulting in basal and apical portions of aedeagus pointing in almost same ventrocaudal direction, approximate basal sixth markedly and irregularly expanded ventrocaudad, apical third sublinear; small apical portion opening laterad and ventrad, directed somewhat ventrad, with dorsal half heavily sclerotized and with or without several minute spines, with ventral half weakly sclerotized and flattened, extreme apex acute.

Vesica rather short, slender, membranous, unarmed.

TYPE.—♂ and ♀ types in the British Museum (Natural History).

TYPE LOCALITY.—"Arizona."

DISTRIBUTION.—Southwestern United States. Arizona.

SOURCES OF MATERIAL.—American Museum of Natural History (5 ♂♂, 1 ♀); Cornell University (5 ♂♂); University of Kansas (4 ♂♂).

SPECIMENS EXAMINED.—15 (14 ♂♂, 1 ♀), from 5 localities:

ARIZONA: Baboquivari Mountains, 4 ♂♂ (no date, F. H. Snow); Fort Grant, 2 ♂♂ (Pinaleno Mountains, July 13–19, 1917, Cornell University Biological Expedition); Globe, ♂ ("Vicinity of Globe," Aug. 4–5, 1937, A. B. Klots); Superior, ♂ (Boyce Thompson Arboretum, Aug. 1, 1937, A. B. Klots); Tucson, 3 ♂♂ (July 22, 1917, collector unknown), 3 ♂♂, ♀ (July 30, 1937, A. B. Klots).

REMARKS.—This species undoubtedly ranges southward into Mexico, and is closely related to *cressoni* and *crescentellus*, with which it forms a distinct species group related to those acrolophids having short labial palpi, setose eyes, simple antennae, simple uncus, and fused gnathos. As characterized in the key, the *cressoni-maculifer-crescentellus* species group consists of small moths having eyes clothed with recumbent or recurved setae, rings of antennal scales widely separated and resembling small funnels, forewings with small patches of upraised scales, and a type of uncus consisting of a single process minutely and acutely bifid at the extreme apex. The vesica of the aedeagus is unarmed in these three species. *Acrolophus maculifer* may be distinguished from its close relatives, as well as from all other acrolophids treated here, by its characteristic harpe and aedeagus, the latter organ being very strongly recurved in this species. The genital characters of *maculifer* are consistent throughout my rather small series representing this insect.

Mr. Tams of the British Museum (Natural History) has sent photographs labeled "*maculifer* Wals., type" and showing the adult ♂ and ♀ and their respective genitalia which confirm the identity of this species.

20. *Acrolophus cressoni* (Walsingham)

FIGURES 107–109

Eulepiste cressoni Walsingham, 1882, Trans. Amer. Ent. Soc., vol. 10, p. 169, Nov.; 1887, Trans. Ent. Soc. London, p. 142.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5044.—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 306; 1903, List North Amer. Lep., p. 577, no. 6579.—Walsingham, 1915, Biol. Cent.-Amer., pt. 12, vol. 4, pp. 377, 385.

Acrolophus (*Eulepiste*) *cressoni* Busck, 1910, Proc. Ent. Soc. Washington, vol. 11, no. 4, p. 187; 1912, Rep. Laguna Marine Lab., vol. 1, p. 169.

Acrolophus cressoni Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8160.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9546.

Walsingham's original description follows:

Eulepiste cressoni—Palpi brown, with ochreous scales intermixed, the apical joint with an indistinct pale ochreous band around its middle. Antennae pale brown. Fore wings brown, with scattered purplish fuscous and ochreous scales, the former collected in raised tufts, especially about the dorsal margin; the latter aggregated in the form of three or four square patches, one before, and one beyond the middle of the dorsal margin, one about the middle of the costa and one at or just before the apex. These in some specimens are so arranged as to form an indistinct chess-board pattern, the dark and pale squares being alternate on the costal and dorsal halves of the wing; in some specimens the median costal and the antemedian dorsal pale squares, which are always somewhat the most conspicuous, are joined in an angulated fascia. Abdomen with the hind wings and their cilia dull brown. The first two pairs of legs conspicuously spotted with brown and ochreous, the third pair ochreous on the tibiae, spotted with brown on the tarsal joints. Expanse 15 to 20 millim., the ♀ being larger than the ♂.

Several specimens in the collection of the American Entomological Society of Philadelphia, from (Bosque County) Texas. I have long possessed and known this species, but could not believe it to be still undescribed, as it seems to be common in Texan collections; but I am unable to find any description agreeing with it. In coloration this seems to be almost inseparable from the preceding species (*simulatus*), but its short palpi and the neuration of the fore wings amply distinguish it, and probably do not justify the juxtaposition of the two species in systematic order. *Eulepiste,* indeed, exhibits some signs of affinity to the genus *Acrolepia.*

Walsingham (1887) later discussed this species in his revision and referred to his original description when he commented:

To this I may add that the thorax is crested posteriorly, the uncus double with the points abruptly bent over, very closely approximate, and laterally compressed or flattened; the lateral claspers of approximately even width throughout, the ends rather square, but slightly oblique.

Male genitalia.—Vinculum typical, as in other species.

Tegumen similar to that of *maculifer;* lateral arm of medium width, narrowing at point of articulation with vinculum, punctate except in anterior and basal areas; dorsal area almost entirely divided along meson by triangular emargination, heavily punctate except near cephalic margin.

Harpe simple, somewhat variable, similar to that of *maculifer.* Lateral aspect: costa and sacculus fused, reduced, narrow, comprising approximate basal third of harpe; glabrous except for heavily punctate and setose, subdigitate, ventrocaudal margin of sacculus; basal third strongly narrowing to acute basal extremity. Cucullus distinct from costa and sacculus, large, elongate, rather broad, sublinear, not curving mesad; heavily punctate and setose, especially so on ental surface; dorsal and ventral margins sublinear to moderately sinuate, subparallel or gradually diverging distad to broadest area of harpe near apex; apex slightly narrowed, broadly and evenly rounded.

Transtilla with arm rather short, subparallel with to somewhat divergent from dorsal margin of costa, terminating subacutely distad of base of harpe.

Uncus simple, same as that of *maculifer.* Dorsal aspect: base glabrous, with cephalic margin emarginate mesad; lateral margins heavily sclerotized, sublinear, gradually converging distad into uncal process. Uncal process indistinctly fused with base, concave beneath, gradually narrowing and curving ventrad toward apex; apex sparsely setose and moderately expanded into pair of minute, acute, heavily sclerotized, laterally flattened, slightly divergent processes.

Gnathos fused, similar to that of *maculifer* although not identical; considerably reduced, heavily sclerotized, thickened dorsoventrad except in apical portion, curving ventrocaudad, glabrous, lateral

margins sublinear and gradually converging distad to narrow but evenly rounded apex.

Anellus membranous, unarmed; juxta absent, although upturned flap at base of aedeagus may be mistaken for one.

Aedeagus of medium length, slender, tubular, asymmetrical, subglabrous, approximately linear in dorsal and ventral aspects, sinuate and irregularly curving ventrad through angle of approximately 90° in lateral aspect, gradually and evenly narrowing distad from near base to near apex, ventral surface of base broadly and evenly expanded ventrad into flattened flap with apical half curving sharply through angle of 180° to rest against ventral surface of basal half (not to be mistaken for juxta); apex narrowing, subacute, with small dextral opening, with small ventral area minutely spinose.

Vesica small, membranous, unarmed.

TYPE.—Type ♂ in the British Museum (Natural History). Additional type material at the Academy of Natural Sciences of Philadelphia.

TYPE LOCALITY.—Bosque Co., Tex.

DISTRIBUTION.—Southern United States. Arizona eastward to Florida.

SOURCES OF MATERIAL.—American Museum of Natural History (2 ♂♂); California Academy of Sciences (1 ♂); Cornell University (1 ♂); Denison University (1 ♂, 2 ♀♀); Illinois State Natural History Survey (3 ♂♂, 1 ♀).

SPECIMENS EXAMINED.—11 (8 ♂♂, 3 ♀♀), from 5 localities:

ARIZONA: Boulder Springs, Mohave Co., ♂, ♀ (July 1–15, 1921, ♀ with three mites on eyes, O. C. Duffner); Hualapai Mountains, ♀ (July 15–30, 1921, two mites on wing, O. C. Duffner); Pinal Co., "14 miles east of Oracle," ♂ (July 24, 1924, E. P. Van Duzee). FLORIDA: Winter Park, ♂ (Sept. 1946, A. B. Klots). TEXAS: Basin, Big Bend National Park, Brewster Co., ♂ (July 5, 1948, C. & P. Vaurie); locality and date unknown, 3 ♂♂, ♀ ("Tex.," Andreas Bolter collection), ♂ ("Paratype," M. E. Murtfeldt collection, Cornell University).

REMARKS.—This species undoubtedly ranges southward into Mexico, with the specimen from Florida considerably darker than the others. *A. cressoni* is closely related to *maculifer* and *crescentellus*, with which it forms a distinct species group. This group has been characterized in the key and in the foregoing remarks on *maculifer*. All three species may be distinguished from one another, and from all other acrolophids treated here, on the basis of their harpes and aedeagi. In *cressoni*, the aedeagus is curved strongly ventrad and its base is expanded into a recurved process. The genital characters are consistent throughout my rather small series of this species.

Mr. Tams of the British Museum (Natural History) has sent photographs labeled "*cressoni* Wals., type" showing the adult ♂ and its genitalia. These photographs confirm the identity of this species.

In the U.S. National Museum there is a slide of ♂ genitalia labeled "*cressoni* Wlsm." Upon examination of this preparation, I found that it agreed with my concept of this species.

Darlington (in litt., 1946) has reported an additional type specimen of this species at the Academy of Natural Sciences as follows: "*cressoni* Wlsh. Type. Expanded and in fair condition, maculation distinct. There might be some question as to whether this is the type or only a paratype."

21. *Acrolophus crescentellus* (Kearfott)

FIGURES 110–111

Amydria crescentella Kearfott, 1907, Can. Ent., vol. 39, no. 1, p. 9, Jan.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 192, no. 8208.

Acrolophus (*Amydria*) *crescentella* Busck, 1910, Proc. Ent. Soc. Washington, vol. 11, no. 4, p. 187.

Myrmecozela crescentella McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 104, no. 9598.

Kearfott's original description follows:

Amydria crescentella—Expanse, 16 to 18 mm.

Palpi, head, antennae and thorax very pale brown, dusted with dark brown, the latter predominant on external surfaces of palpi. Abdomen and legs pale cinereous, tarsi dusted with brown.

Fore wing creamy white, slightly dusted with brown scales; this light ground colour only occurs in a large triangular basal patch, extending to a quarter on costa and nearly to middle on dorsal margin. A curved oblique fascia from middle of costa to end of cell, a similar but narrower fascia from costa just before apex, curving inwardly towards but not reaching the middle fascia. These two fascias are so sharply defined against the dark brown of the balance of the wing that they appear as a crescent-shaped band, interrupted in the middle.

The balance of the wing is cinnamon-brown, dotted with darker brown. In some specimens the pale basal area is rather heavily dusted with brown inwardly, leaving only the margin of the pale colour, forming a narrow oblique fascia. On the costa, within the crescent, are two pale dashes separated by a dark dot, and outwardly bounded by dark brown, which also extends below them. Before the middle of fascia the costa is cream colour, marked by a number of brown dots. On the outer margin is a line of dark brown dots, separated by a few paler scales. Cilia same as dark portion of wing.

Hind wing light cinnamon-brown, under side of both wings the same.

Five specimens, all Baboquivaria Mountains, Pima C., Arizona, July 15 to 30; two collected by Prof. F. H. Snow, three by Mr. O. C. Poling.

Types, University of Kansas and in my collection.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen with lateral arm heavily punctate except in cephalic and basal areas, abruptly narrowing in basal third to point of articulation with vinculum, central third considerably expanded ventrad, apical third evenly narrowing dorsocaudad; dorsal area almost entirely divided along meson by cephalic emargination, mesal and caudal areas glabrous, laterocephalic areas punctate.

Harpe simple. Lateral aspect: similar to that of *cressoni*, but with basal half curving ventrad and apical half curving back dorsad equally as far. Costa and sacculus reduced, fused, comprising slightly more than basal third of harpe, glabrous except for heavily punctate and setose subdigitate ventrocaudal margin of sacculus, basal third very narrow. Cucullus only partly distinct from costa and sacculus, gradually curving mesad in apical half, large, elongate, rather broad, heavily punctate and setose (especially entad), dorsal and ventral margins subparallel, apical third slightly expanded, apex broadly and evenly rounded.

Transtilla with arm rather short, glabrous, slightly convergent with dorsal margin of costa, about one-sixth as long as harpe, terminating above base of harpe.

Uncus simple, similar to that of *cressoni*. Dorsal aspect: base glabrous, with cephalic margin emarginate mesad; lateral margins heavily sclerotized, sublinear, gradually converging into uncal process. Uncal process fused with basal area, slightly expanded before apex in dorsal aspect, gently curving ventrad to apex, sparsely punctate, apex minutely and acutely bifid as in *maculifer* and *cressoni*.

Gnathos fused, similar to that of *cressoni;* reduced, heavily sclerotized, glabrous, thickened dorsoventrad except in apical area, curving ventrocaudad, lateral margins sublinear and converging gradually to subacute apex.

Anellus membranous, glabrous, juxta absent.

Aedeagus rather short and slender, asymmetrical, glabrous, linear in dorsal and ventral aspect, basal and apical quarters curving gently ventrad in lateral aspect, basal quarter somewhat expanded laterad and broadly opening dorsad, apical three-fourths tubular and gradually narrowing to narrowly rounded apex, apical area with small dextral opening.

Vesica small, membranous, glabrous.

Type.—Three ♂ cotypes (type no. 61451) in the U.S. National Museum. Two additional cotypes presumably at the University of Kansas.

Type locality.—Baboquivari Mountains, Pima Co., Ariz.

Distribution.—Southwestern United States. Southern Arizona.

Source of material.—American Museum of Natural History (8 ♂♂, 1 ♀).

Specimens examined.—9 (8 ♂♂, 1 ♀), from one locality:

Arizona: Tucson, Pima Co., 8 ♂♂, ♀ (July 30, 1937, A. B. Klots).

Remarks.—This species undoubtedly ranges southward into Mexico. The specific name should be spelled *crescentellus* to agree grammatically with its present genus. It is closely related to *cressoni* and *maculifer*, with which it forms a distinct species group, which has been

characterized in the key and in the foregoing remarks on *maculifer*. All three species may be distinguished from one another, as well as from all other acrolophids treated here, on the basis of their harpes and aedeagi. The latter organ is of especial value in the separation of these three species which are otherwise so similar in regard to general habitus and genital structure. In *crescentellus*, the aedeagus is sublinear except at its basal and apical extremities. The genital characters are consistent throughout my rather small series of this species.

Kearfott originally described this species under the genus, *Amydria*, apparently not considering it to be an acrolophid. Busck (1910) properly transferred it to *Acrolophus* and said of it: "This species is nearest *Acrolophus* (*Eulepiste*) *cressoni* Walsingham." The three ♂ cotypes now in the U.S. National Museum have recently been assigned a type number during the course of this revision. They are labeled "*Amydria crescentella* Kearf." Two of these specimens are further labeled "Baboquivaria Mts., Pima Co., Arizona, July 15–30, 1903, Coll. O. C. Poling." The third specimen bears the label, "Baboquivaria Mts., Ariz., F. H. Snow." My examination of these cotypes found them to be identical and confirmed the identity of this species.

22. *Acrolophus piger* (Dyar)

FIGURES 112–117

Ortholophus piger Dyar, 1900, Can. Ent., vol. 32, no. 11, pp. 327–328, Nov.—Dyar, 1903, List North Amer. Lep., p. 579, no. 6597.

Acrolophus piger Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8189.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9579.

Dyar's original description follows:

Ortholophus piger—Palpi erect, reaching above vertex, free from front, rather smoothly scaled. Fore wings light cinerous, slightly violaceous; an ochreous shade over centre of wing, limited inwardly by a black, mottled line from basal third of costa to above centre of inner margin, and outwardly by a similar line from below outer fourth of costa to opposite centre of outer margin, not reaching either margin. Between these lines the ochreous shade does not reach the costa, and is incised opposite the outer third of inner margin. Wing sparsely irrorate with black, distinctly along costa and in the ochreous shade. A group of dark scales on centre of outer margin. Hind wing blackish, pale along costal edge and extreme base. Expanse 17 mm. Male genitalia with uncus simple, gently curved, broadening toward base; harpes broadly rounded, spoon-shaped, strongly contracted at base, tips evenly rounded.

Three specimens; San Diego, Texas; May 24 to 26 (E. A. Schwarz); U.S. Nat. Mus., type No. 5348.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen with lateral arm of medium width, narrowing to point of articulation with vinculum, cephalic margin sinuate, small punctate area along dorsocaudal margin; dorsal area rather broad, glabrous, cephalic margin broadly and evenly emarginate.

Harpe simple. Lateral aspect: sublinear, broadest in central area. Costa and sacculus fused, rather broad, comprising slightly more than basal half of harpe, dorsal margin quite heavily sclerotized, narrowing only slightly to base, glabrous except for heavily punctate and setose caudo-ental area markedly produced entad and dorsad and terminating subacutely. Cucullus partially set off from costa and sacculus by areas of reduced sclerotization, heavily punctate and setose in apical ental half, basal half mostly glabrous, apical half considerably expanded (especially ventrad) to give capitate appearance, apex broadly and evenly rounded.

Transtilla with arm typical; linear, glabrous, slightly convergent with costal margin, approximately one-fourth as long as harpe, terminating well above base of harpe.

Uncus distinctively bifid, although somewhat atypically and obscurely so. Dorsal aspect: mesal area occupied by elongate, narrow, triangular, caudal extension of tegumen; lateral areas sparsely punctate, regularly converging and narrowing to apices; angle of bifurcation extremely small and obscure; furcae pressed tightly together so as to appear fused, narrowing distad. Lateral aspect: basal portion extending caudad, gradually expanding ventrad at point of bifurcation; furcae less obscurely separate in this aspect, narrowing considerably toward apices; apices directed strongly ventrad and terminating very acutely, occasionally overlapping.

Gnathos paired; arms narrow, heavily sclerotized, overlapping so closely as to appear to be a single process, directed ventrad and slightly caudad, apical portions minutely scobinate, apices narrowly rounded.

Anellus membranous, glabrous, juxta absent.

Aedeagus of medium length and width, cylindrical, asymmetrical, glabrous, sublinear in dorsal and ventral aspects, basal fourth directed somewhat ventrad in lateral aspect; base slightly expanded and emarginate in ventral aspect, opening dorsad; apical third opening broadly dextrad.

Vesica membranous, dextral margin armed with indefinite row of 12 or more cornuti. Cornuti minute, weakly sclerotized, indistinct, unequal in size, with acute apices, directed caudad.

TYPE.—Type ♂ (type no. 5348) in the U.S. National Museum.

TYPE LOCALITY.—San Diego, Duval Co., Tex.

DISTRIBUTION.—Texas eastward to Florida.

SOURCE OF MATERIAL.—American Museum of Natural History (3 ♂♂, 1 ♀).

SPECIMENS EXAMINED.—4 (3 ♂♂, 1 ♀), from 2 localities:

FLORIDA: Lake Placid, ♀ (Archbold Biological Station, July 15–31, 1948, A. B. Klots); Winter Park, ♂ (June 1946, A. B. Klots), ♂ (July 1946, Klots), ♂ (Sept. 1946, Klots).

REMARKS.—This species undoubtedly ranges southward and westward into Mexico and is closely related to *vanduzeei*, the two comprising a small species group. The *piger-vanduzeei* species group consists of small moths having shortened labial palpi, eyes rather densely clothed with erect setae, simple antennae with segments encircled by rings of large scales, bifid uncus, and paired gnathos. The vesica of the aedeagus is armed with cornuti in these two species. *A. piger* may be distinguished from its close relative, as well as from all the other species treated here, by its characteristic harpe and aedeagus. In the latter structure, the armature of the vesica is quite distinctive for this species. Although *piger* superficially resembles *forbesi* in general habitus, the two are not closely related.

I have examined the type ♂ specimen at the U.S. National Museum. It is labeled "*Ortholophus piger* Dyar, type no. 5348, San Diego, Texas, May 26, 1895, Coll. E. A. Schwarz." Dr. Clarke removed the genitalia of the type for me and the identity of this species was thus further confirmed.

It is interesting to note that Dyar's type series of three ♂ specimens representing *piger* actually represents three entirely different species. The first specimen, set aside as the holotype or "type," properly represents *piger* as a valid species. The second specimen, set aside as a paratype or "cotype," is equivalent to my new species, *vanduzeei*. The third specimen, also designated as a paratype or "cotype," represents a third but already described species.

23. *Acrolophus vanduzeei*, new species

FIGURES 118–121

MALE.—Similar to *piger* in general habitus. Head luteous suffused with white. Labial palpi intermediate in length, recurved back over head and extending to anterior margin of thorax, weakly to strongly diverging from each other distad, moderately diverging from head distad, inner surfaces luteous but heavily fringed with white, outer surfaces ochreous suffused with fuscous, apical segments fuscous fringed with white. Eyes large, protruding, weakly lashed; rather densely clothed with short, erect setae. Antennae simple, luteous, each segment completely encircled by ring of large scales. Thorax luteous suffused with white. Forewings ashy-gray marked with brown and

fuscous; markings in form of brown spots along apical margin, fuscous spot at outer end of cell, and brownish patch covering basal third above fold; color pattern quite variable, commonly reduced to rich brown ground color with several diffused luteous patches. Hindwings and fringes brown. Abdomen grayish-brown; tip and apical portions of genitalia covered with elongate, slender, pale brownish scales. Wing expanse: 16 to 21 mm.

FEMALE.—Coloration generally similar to that of ♂, pattern of forewings not as variable as in ♂. Labial palpi somewhat shorter than in ♂, partially recurved over head and extending considerably above antennal bases, gradually diverging from head and from each other distad. Eyes similar to those of ♂ except less densely setose. Antennae slender, otherwise similar to those of ♂. Forewings grayish, speckled with dark brown or fuscous, with broad patch of grayish white extending along apical half of costa. Wing expanse: 24 to 27 mm.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen with lateral arm elongate, slender, margins sublinear, evenly narrowing to point of articulation with vinculum, narrow punctate area near dorsocaudal margin; dorsal area of medium width, weakly sclerotized, glabrous, cephalic margin broadly emarginate.

Harpe simple, somewhat similar to that of *piger*. Lateral aspect: sublinear, broadest in central third of cucullus. Costa and sacculus fused, of medium width, comprising approximate basal half of harpe, dorsal margin heavily sclerotized, narrowing slightly to base, glabrous except for sparsely setose caudo-ental area weakly produced cephalodorsad and terminating subacutely. Cucullus partially set off from costa and sacculus by areas of reduced sclerotization, heavily punctate and setose in apical ental two-thirds, basal third mostly glabrous, dorsal margin sublinear, basal third rather narrow and slightly constricted, central third broadly and evenly expanded ventrad to almost three times width of narrowest portion of basal third, apical third gradually and evenly narrowing ventrad to broadly and evenly rounded apex.

Transtilla with arm typical; glabrous, slightly curved and convergent with costal margin, approximately one-fifth as long as harpe, terminating well above base of harpe.

Uncus bifid, essentially like that of *piger*. Dorsal aspect: base partially fused with caudal margin of tegumen, partially separated by areas of reduced sclerotization; mesal area weakly sclerotized, concave; lateral areas heavily sclerotized, punctate, evenly converging and narrowing to apices; angle of bifurcation small, very narrowly rounded; furcae narrowly separated at bases, strongly convergent with resultant marked overlapping of apical portions. Lateral aspect: basal and

apical areas narrowed, central area considerably expanded, apices directed caudoventrad and terminating acutely.

Gnathos paired, similar to that of *piger*; arms directed ventrad, lateral margins heavily sclerotized, apical portions scobinate and slightly overlapping, apices bluntly rounded.

Anellus membranous, glabrous, juxta absent.

Aedeagus of medium length and width, cylindrical, asymmetrical, glabrous, sublinear in dorsal and ventral aspects, approximate apical half curving gradually ventrad in lateral aspect, base somewhat expanded laterad, approximate apical three-fifths opening broadly ventrad; sinistral wall of aedeagus containing elongate, narrow, heavily sclerotized area extending almost to and becoming more distinct toward apex.

Vesica membranous, armed with approximately fifteen cornuti of various sizes, several very minute. Cornuti located mostly in perimeter of vesica and superficially appearing to belong to adjacent borders of aedeagus; arranged in form of incomplete oval along sinistral, ventral, dextral, and apical margins of vesica; well sclerotized, apices acute, two apical cornuti about twice as large as others and directed distad.

TYPE.—Holotype ♂ (type no. 61441) in the U.S. National Museum.

PARATYPES (6 ♂♂, 3 ♀♀).—California Academy of Sciences (1 ♂); U.S. National Museum (5 ♂♂, 3 ♀♀).

TYPE LOCALITY.—San Benito, Cameron Co., Tex. (Sept. 8–15, collector unknown).

DISTRIBUTION.—Southwestern United States. Texas westward to Arizona.

SPECIMENS EXAMINED.—10 (7 ♂♂, 3 ♀♀), from 5 localities:

ARIZONA: Baboquivari Mountains, Pima Co., ♀ (June 15–30, 1923, elevation approximately 5000 feet, O. C. Poling), 2 ♂♂, ♀ (Aug. 15–30, 1923, Poling), ♂, ♀ (July 15–30, 1924, Poling); Patagonia, Santa Cruz Co., ♂ (Aug. 2, 1924, E. P. Van Duzee). TEXAS: Brownsville, Cameron Co., ♂ (April 28, 1904, H. S. Barber); San Benito, Cameron Co., ♂ (Sept. 8–15, collector unknown); San Diego, Duval Co., ♂ (May 26, 1895, E. A. Schwarz).

REMARKS.—This species undoubtedly ranges southward into Mexico. It is closely related to *piger*, the two comprising a small species group. *A. vanduzeei* may be distinguished from its close relative, and from all the other acrolophids treated here, by its characteristic harpe and aedeagus. In the latter structure, the armature of the vesica is distinctive for this species. In other respects, *vanduzeei* is similar to *piger* on the basis of general habitus and genital structure; the similarity is especially noticeable in regard to their oddly shaped unci. This species is named in honor of the late Edward P. Van

Duzee. A number of the acrolophids collected by him have proved to represent new species.

24. *Acrolophus pseudohirsutus*, new name

FIGURES 122–124

Acrolophus hirsutus Busck, 1912, Proc. Ent. Soc. Washington, vol. 14, no. 3, p. 184, Sept. (preoccupied by Brazilian genotype, *Thysanoscelis hirsutus* Walsingham, 1887, Trans. Ent. Soc. London, pp. 145–146, pl. 7, figs. 3, 3a, 3b, 3c. The sinking of *Thysanoscelis* as a synonym of *Acrolophus* has resulted in the combination, *Acrolophus hirsutus* (Walsingham) 1887).—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8162.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9548. (New synonymy).

Eulepiste (?) *hirsutus* Barnes & McDunnough, 1913, Can. Ent., vol. 45, no. 12, p. 420.

Busck's original description follows:

Acrolophus hirsutus—Labial palpi as in the foregoing species (*diversus*), reaching vertex; ocherous, touched with dark brown. Head and thorax dark ocherous, mottled with black; thorax with short ocherous posterior tuft. Forewings ocherous, strongly suffused and mottled with dark brown and black; a faint series of terminal and costal dark dots, a black second discal spot, preceded and followed by a clear ocherous space, a short oblique plical spot, surrounded by light scales.

Hind wings dark brown with lighter base and a faint ocherous submarginal line. Abdomen dark brown above; anal tuft and under side ocherous.

Alar expanse, 20 to 22 mm.

Habitat: La Puerta Valley, California, June (Geo. H. Field, collector).

Type: No. 15123, U.S. Nat. Mus.; cotype in Mr. Field's collection.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen typical, glabrous to minutely punctate; lateral arm elongate, slender, evenly narrowing toward point of articulation with vinculum; dorsal area narrow, with cephalic margin emarginate.

Harpe simple. Lateral aspect: costa and sacculus indistinctly fused, very large, broad, elongate, comprising basal three-fifths of harpe, apical portion moderately and evenly expanded ventrad, evenly narrowing to slender basal extremity, sparsely and minutely punctate, ventrocaudal margin of sacculus heavily punctate and setose. Cucullus separated from costa and sacculus by ventral constriction and area of reduced sclerotization, reduced, shortened, rather slender, sparsely punctate and setose ectad and entad, curving considerably ventrad toward apex, basal portion somewhat narrowed, apical portion somewhat expanded, broadest at or near apex, dorsal margin quite smooth although becoming moderately sinuate near apex, central portion of ventral margin roughly dentate; apex dentate, with 5–10 teeth varying in size and shape, ventral tooth commonly larger than others.

Transtilla with arm rather short, basal portion broad, sublinear, glabrous, weakly diverging from dorsal margin of costa toward subacute apex, failing to reach base of harpe by its own length.

Uncus simple. Dorsal aspect: base small, subtriangular, set off from tegumen by areas of reduced sclerotization, sparsely punctate and setose, laterobasal margins rounded, lateral margins converging into base of uncal process; uncal process indistinctly fused with base, rather elongate and slender, tubular, sparsely punctate and setose, curving slightly ventrad toward apex, gradually narrowing distad, apex acute.

Gnathos fused, rather elongate and slender, directed ventrocaudad, glabrous, somewhat thickened dorsoventrad, dorsal surface weakly concave, lateral margins well sclerotized and parallel, apex broadly and very evenly rounded.

Anellus large, membranous; densely clothed with minute, setalike processes; juxta absent.

Aedeagus elongate, slender, cylindrical, asymmetrical, glabrous, sublinear in dorsal and ventral aspects, basal fifth curving somewhat dorsad in lateral aspect, basal portion moderately expanded, apical portion opening dextrad, apex narrowly rounded.

Vesica rather small, membranous, basal portion narrowed; apical portion bulbous, armed with single cornutus; cornutus rather small, acute, directed distad.

TYPE.—Type ♂ (type no. 15123) in the U.S. National Museum.

TYPE LOCALITY.—La Puerta Valley, Calif.

DISTRIBUTION.—Western United States. California southward into Mexico.

SOURCES OF MATERIAL.—American Museum of Natural History (5 ♂♂); California Academy of Sciences (1 ♂); Carnegie Museum (3 ♂♂); Mr. Alex K. Wyatt, Chicago, Ill. (2 ♂♂).

SPECIMENS EXAMINED.—11 (all ♂♂), from 2 localities:

CALIFORNIA: La Puerta, 8 ♂♂ (July 1911, Wright & Field); La Puerta Valley, 2 ♂♂ (July 1911, Geo. H. Field). MEXICO: Angeles Bay, Gulf of California, ♂ (May 4, 1921, E. P. Van Duzee).

REMARKS.—The new name, *pseudohirsutus*, is here proposed to replace Busck's preoccupied name, *hirsutus*. This species is very closely related to *kearfotti*, the two comprising a small species group. The *kearfotti-pseudohirsutus* group consists of acrolophids having short labial palpi, naked eyes, simple antennae with segments encircled by rings of scales, simple uncus, and fused gnathos. These two species may be easily separated from all other species treated here, as well as from each other, by the structure of their harpes. They may also be distinguished from the other acrolophids, although not from each other, on the basis of their aedeagi. This great similarity of the

aedeagi could possibly be used as an argument for placing *pseudohirsutus* as a subspecies of *kearfotti*, a situation discussed in my remarks on the latter species. However, the two are retained here as distinct species. The characters furnished by the cucullus of the harpe in *pseudohirsutus* are both distinctive and consistent throughout my rather small series of this insect. The name, *pseudohirsutus*, has been coined from the Greek word, *pseudēs*, meaning "false," applied as a prefix to Busck's old name, *hirsutus*.

I have examined the type ♂ specimen at the U.S. National Museum. It is labeled "*Acrolophus hirsutus* Busck, type no. 15123, La Puerta Valley, Calif., July 1911, Geo. H. Field." The specimen readily confirms the identity of this species.

A. hirsutus, described by Busck in 1912, is still a valid species although its name is preoccupied and must be replaced.

In his revision of 1887, Walsingham erected a new genus, *Thysanoscelis*, designating as its genotype the new species, *T. hirsutus*, from Espirito Santo, Brazil. Following his description of *hirsutus*, Walsingham stated:

> I have two males of this curious species, purchased of Deyrolle in Paris many years ago. They obviously belong to the same group as *Acrolophus*, *Anaphora*, etc., but cannot, so far as I can determine, be rightly included in any hitherto described genus.

About the time Busck described his *hirsutus* from California, a general agreement was developing among the several active describers of acrolophids that most of the genera of the group should be combined and placed under the original genus, *Acrolophus*. Several years later, Walsingham (1915, pp. 375–380) found it necessary to place most of his previously described genera, including *Thysanoscelis*, into synonomy under *Acrolophus*. Thus, *Thysanoscelis hirsutus* became *Acrolophus hirsutus* (Walsingham), with the latter preoccupying *Acrolophus hirsutus* Busck.

Therefore, *hirsutus* Busck should be considered a new synonym of *pseudohirsutus*, the new name here proposed to replace Busck's preoccupied species name.

25. *Acrolophus kearfotti* (Dyar)

FIGURES 125–126

Eulepiste kearfotti Dyar, 1903, Can. Ent., vol. 35, no. 3, p. 76, March.

Acrolophus (*Eulepiste*) *kearfotti* Busck, 1910, Proc. Ent. Soc. Washington, vol. 11, no. 4, p. 186.

Acrolophus diversus Busck, 1912, Proc. Ent. Soc. Washington, vol. 14, no. 3, p. 184, Sept.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8158.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9544. (New synonymy.)

Acrolophus kearfotti Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8166.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9552.

Dyar's original description follows:

Eulepiste Kearfotti—Gray, with a reddish ochreous tint, brighter in an obscure streak beyond cell and on submedian fold. A series of black strigae along the costa and on fringe; a small dash beyond cell, and an oblique bar in submedian fold beyond middle. Hind wing blackish, fringe long, pale, interlined with blackish. Below, blackish, with a pale line at the base of the fringe. Expanse, 22 mm.

Two males from Mr. W. D. Kearfott's collection, "Yuma Co., Ariz. Desert."

Larger than the other species of *Eulepiste*, and differing in the genitalia. Uncus a single long spine, curving downward, opposed to a broad, concave basal plate. Side pieces strap-shaped or slightly concave, curved downward, and with a distinct spine on the lower angle.

U.S. National Museum, type No. 6734.

Male genitalia.—Vinculum as in *pseudohirsutus*.

Tegumen as in *pseudohirsutus*, but commonly without emargination in cephalic margin of dorsal area.

Harpe simple. Lateral aspect: costa and sacculus as in *pseudohirsutus*, but with central and apical portions considerably broader.

Cucullus differing from that of *pseudohirsutus* in following respects: rather strongly constricted near base, widening distad of constriction, slightly narrowing again toward apex, dorsal margin with basal half sinuate, ventral margin without dentate area; apex narrowed, strongly emarginate; dorsal extremity of apex in form of subtriangular, acute or subacute projection; ventral extremity of apex in form of large, elongate, spinelike process curving rather strongly mesad toward apex and terminating acutely or subacutely.

Transtilla with arm more broadly divergent from dorsal margin of costa than in *pseudohirsutus*; quite variable, rather short and stout to fairly long and slender.

Uncus, gnathos, and anellus as in *pseudohirsutus*.

Aedeagus similar to that of *pseudohirsutus* except for basal portion: basal one-fifth to one-fourth more smoothly and evenly expanded, curving somewhat ventrad; with small ventral expansion distad of main basal expansion.

Vesica and cornutus as in *pseudohirsutus*.

Type.—Type ♂ (type no. 6734) in the U.S. National Museum.

Type locality.—"Yuma County, Arizona Desert."

Distribution.—Southwestern United States. California eastward to Texas.

Sources of material.—American Museum of Natural History (8 ♂♂); California Academy of Sciences (1 ♂); Carnegie Museum (3 ♂♂); Cornell University (1 ♂); Mr. Alex K. Wyatt, Chicago, Ill. (1 ♂).

SPECIMENS EXAMINED.—14 (all ♂♂), from 5 localities:

CALIFORNIA: Jacumba, ♂ (Aug. 13, 1917, J. C. Bradley); Rancho La Sierra, Riverside Co., ♂ (Aug. 29, 1940, Fred H. Rindge collection), ♂ (Sept. 17, 1940, Rindge), ♂ (July 31, 1941, Rindge), ♂ (Aug. 7, 1941, Rindge), ♂ (July 9, 1942, three mites on abdomen, Rindge), ♂ (Aug. 16, 1942, Rindge), ♂ (July 17, 1947, Rindge); San Diego, ♂ (June 27, 1911, Geo. H. Field), ♂ (June 30, 1911, W. S. Wright), ♂ (July 1, 1911, Wright), ♂ (Aug., L. E. Ricksecker); Santa Paula, ♂ (July 31, 1923, H. H. Keifer). TEXAS: Boquillas, Brewster Co., ♂ (July 7, 1948, C. & P. Vaurie).

REMARKS.—This species undoubtedly ranges southward into Mexico. It has one synonym, *diversus* Busck, described from San Diego, Calif. *A. kearfotti* is very closely related to *pseudohirsutus*, the two comprising a small species group. This group has been characterized in the key and in the foregoing remarks on *pseudohirsutus*. These two species may be distinguished from the other acrolophids treated here on the basis of their harpes and aedeagi. However, the two may be distinguished from each other only by the differences occurring in the cuculli of their harpes. Except for this structure, the genitalia of both species are essentially the same. Their aedeagi are so similar that their distinctness as good species may be questioned. However, since the color patterns of the two moths are different and since *kearfotti* is at least half again as large as *pseudohirsutus*, they are retained here as distinct species.

I have examined the type ♂ specimen at the U.S. National Museum. It is labeled "*Eulepiste kearfotti* Dyar, type no. 6734, Desert, Yuma Co., Ariz." My examination of a slide preparation of the ♂ genitalia of the paratype, also from Yuma County, further confirmed the identity of this species.

Busck described *Acrolophus diversus* as a new species in 1912. Following his description, he stated:

> Alar expanse, 27 to 28 mm. Habitat: San Diego, California, July (Geo. H. Field, collector). Type: No. 15122, U.S. Nat. Mus.; cotype in Mr. Field's collection. Nearest in pattern and size as well as in the form of the palpi to *Acrolophus* (*Neolophus*) *persimplex* Dyar, from which it differs in the clearer color, more distinct pattern, and less hairy labial palpi.

Since 1912, *diversus* has appeared in the literature as a distinct species.

The type ♂, at the U.S. National Museum, is labeled "*Acrolophus diversus* Busck, type no. 15122, San Diego, Calif., 7/2/11, Geo. H. Field." After examining the type and a slide mount of the ♂ genitalia of a paratype, also from San Diego, I found them to be equivalent to Dyar's older species, *kearfotti*, the type ♂ of which is also at the U.S. National Museum.

Thus, *diversus* Busck should be considered a new synonym of *kearfotti* (Dyar). I fail to find any noticeable resemblance or relationship between Busck's *diversus* and *persimplex* (Dyar). Perhaps

Busck failed to compare *diversus* with the much more similar type of *kearfotti*, also presumably then available to him for study at the National Museum, because he felt that the latter species must be distinct as a result of its smaller wing expanse (22 mm.) and different type locality ("Yuma Co., Ariz. Desert").

26. *Acrolophus furcatus* (Walsingham)

FIGURES 127–131

Neolophus furcatus Walsingham, 1887, Trans. Ent. Soc. London, p. 141, pl. 7, figs. 1, 1a, 1b, June.—Smith, 1891, List Lep. Bor. Amer., p. 94, no. 5043.—Dyar, 1903, List North Amer. Lep., p. 577, no. 6577.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 377.

Acrolophus furcatus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8154.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9540.

Walsingham's original description follows:

Neolophus furcatus—Labial palpi, ♂, slightly recurved, reaching to the back of the head; the apical joint roughly clothed with appressed scales, not brush-like. *Antennae* brownish ochreous, not serrated, although having that appearance at the tips, owing to the presence of raised scales. *Head*, *thorax*, and *palpi* dull greyish fuscous. *Fore wings* rather narrow, the costa almost straight, the apical margin oblique, scarcely convex; apical vein forked; greyish, sprinkled and striated around the margins with brownish fuscous; a broad irregular streak of brownish fuscous, from the base to the end of the cell, partly connected with two ill-defined spots of the same colour on the inner and outer thirds of the fold; fringes greyish fuscous. *Hind wings* pale greyish brown. *Abdomen* the same; lateral claspers narrow towards the base, rather triangular and upturned beyond it, obtusely rounded at the apex; uncus double, nearly straight, scarcely at all bent over, its opposing branch below being of nearly equal length with itself. *Exp. al.* ♂, 19 mm.

Hab. A single male from Arizona, collected by Morrison.

Walsingham's illustrations consisted of: figure 1, the adult ♂ in dorsal aspect (in color); figure 1a, the head of the ♂ in lateral aspect; and, figure 1b, the uncus, gnathos, and cucullus of the ♂ genitalia in lateral and dorsal aspects.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen with lateral arm elongate, narrow, glabrous; dorsal area of medium width, glabrous, cephalic portion upraised, caudal margin irregular.

Harpe simple. Lateral aspect: sublinear, broadest in caudal portion of costa and sacculus. Costa and sacculus fused, broad in caudal portion, narrowing toward base, comprising approximate basal three-fifths of harpe, glabrous except for punctate and setose ventrocaudal margin of sacculus. Cucullus partially set off from costa and sacculus by areas of reduced sclerotization, very sparsely and weakly punctate and setose, margins smooth, dorsal margin

curving gradually and evenly dorsad to apex, basal third narrow and with margins subparallel, central portion evenly and broadly expanded ventrad to about twice width of basal third, apical portion narrowing considerably ventrad to apex; apex evenly and rather narrowly rounded, directed dorsocaudad and also curving mesad.

Transtilla with arm well sclerotized, glabrous, quite short, only about one-sixth as long as harpe, terminating acutely far above base of harpe, basal two-thirds diverging from costal margin of harpe, apical third converging toward costal margin.

Uncus bifid. Dorsal aspect: base separated from tegumen by irregular and roughened area of reduced sclerotization, cephalic margin deeply emarginate mesad, mesal area glabrous; lateral areas heavily sclerotized, sparsely punctate and setose, gradually converging distad and smoothly fusing into bases of furcae; angle of bifurcation very narrow, obscure; furcae approximate, superficially appearing as single process (especially in dried or untreated specimens), rather elongate and narrow, heavily sclerotized, directed caudad and slightly ventrad, lateral margins sparsely punctate and setose, apices acute and slightly divergent.

Gnathos fused, rather elongate, directed caudad and slightly ventrad, mesal portion weakly sclerotized, apical portion heavily scobinate; lateral margins heavily sclerotized, gradually and evenly converging to rounded and minutely emarginate apex.

Anellus large, membranous, unarmed, juxta absent.

Aedeagus very slender, elongate, approximately as long as harpe, extending back into abdomen, cylindrical, asymmetrical, glabrous, sublinear in dorsal and ventral aspects, approximate apical third to fourth sinuate and curving ventrad in lateral aspect; base expanded laterad and ventrad, emarginate ventrad, opening dorsad; apical fifth opening broadly and consisting simply of well sclerotized, narrow, dextral area terminating distad in short, acute, heavily sclerotized, spinelike process directed caudad.

Vesica membranous, apparently unarmed.

TYPE.—Type ♂ in the British Museum (Natural History).

TYPE LOCALITY.—"Arizona."

DISTRIBUTION.—Southwestern United States. Arizona.

SOURCES OF MATERIAL.—American Museum of Natural History (1 ♂, 1 ♀); California Academy of Sciences (2 ♂♂); University of Kansas (1 ♂).

SPECIMENS EXAMINED.—5 (4 ♂♂, 1 ♀), from 5 localities:

ARIZONA: Baboquivari Mountains, ♂ (no date, F. H. Snow); Dome, ♂ (July 21, 1924, E. P. Van Duzee); Maricopa Co., "10 miles north of Gila Bend," ♂ (July 22, 1924, with mites on abdomen, E. P. Van Duzee); Superior, Pinal Co., ♂ (Boyce Thompson Arboretum, Aug. 1, 1937, A. B. Klots); Tucson, Pima Co., ♀ (July 30, 1937, A. B. Klots).

Remarks.—This species undoubtedly ranges southward into Mexico. It is generally related to *punctellus*, the two comprising a small species group. This group is related to those species having shortened labial palpi, naked eyes, simple antennae with segments encircled by rings of scales, and fused gnathos. In addition, the *furcatus-punctellus* species group is characterized by a type of obscurely bifid uncus in which the furcae are closely appressed and superficially appear simply as a single process with a median longitudinal suture. These two small species may be easily distinguished from one another, as well as from the other acrolophids treated here, on the basis of their harpes and aedeagi. The elongate genital capsule and especially the long, slender aedeagus of *A. furcatus* are somewhat similar to those of *variabilis*, but the genital and external characters of these two species are otherwise quite distinct.

Mr. Tams of the British Museum (Natural History) has sent photographs labeled "*furcatus* Wals., type" which show the adult ♂ and its genitalia. These photographs easily confirm the identity of this species.

27. *Acrolophus punctellus* (Busck)

Figures 132–134

Neolophus punctellus Busck, 1907, Proc. Ent. Soc. Washington, vol. 8, nos. 3–4, p. 99, Aug.

Acrolophus (*Neolophus*) *punctatus* Busck, 1910, Proc. Ent. Soc. Washington, vol. 11, no. 4, p. 187 (name misspelled).

Acrolophus punctellus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8157.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9543.

Busck's original description follows:

Neolophus punctellus—Antennae simple in both sexes, thick, with closely set whorls of short scales which give an appearance of serration; ochreous gray. Labial palpi in the males long, slightly recurved, reaching vertex, closely appressed to the face; in the females much shorter, porrected, terminal joint deflected. The palpi are slightly lighter than the head and thorax, which are covered with light fuscous white-tipped scales; thorax smooth. Fore wings appear pearly, light, whitish fuscous, irregularly and sparsely dotted with black scales; under a lens it is seen that the scales are of different shades of brown, each tipped with very light, nearly white, slate-color, except the few deep black ones, which are slightly metallic. Cilia blackish brown. Venation normal, with 12 veins, 7 to termen just below apex, 8 and 9 stalked, 1b furcate at base. Hind wings ochreous brown, with 8 veins, all separate; 3, 4, 5, 6, and 7 nearly equidistant and parallel from the end of the cell; a forked discal vein to vein 4 and to just below vein 6. Abdomen dark fuscous above. Under side of body whitish. Legs whitish, sprinkled with fuscous; tarsal joints dark brown, tipped with white.

Alar expanse, ♂, 19 mm.; ♀, 24 mm.

Hot Springs, Ariz., (E. A. Schwarz); Las Cruces, New Mexico (T. D. A. Cockerell).

Type.—No. 9905, U.S. National Museum.

A pretty species, which can not be confounded with any other American anaphorid, and is easily recognized by the pearly-black dusted fore wings.

MALE GENITALIA.—Vinculum rather small; typical, as in other species.

Tegumen with lateral arm broad, glabrous, gradually narrowing to point of articulation with vinculum, margins weakly sinuate; dorsal area broad, glabrous, cephalic margin slightly concave, caudal margin produced caudad to fill mesal emargination in base of uncus.

Harpe simple. Lateral aspect: slender, broadest in area of costa and sacculus giving rise to arm of transtilla. Costa and sacculus fused, narrowing slightly toward base, comprising approximate basal half of harpe, glabrous except for punctate and setose ventrocaudal margin of sacculus. Cucullus indistinctly fused with costa and sacculus, sublinear, directed somewhat ventrad, apical three-fourths sparsely punctate and setose (especially along ventral margin), margins sublinear and gradually diverging toward apex, broadest portion of apical area approximately twice width of narrowest portion of basal area; apex with ventral portion produced caudoventrad, ventral margin rather narrowly but evenly rounded, mesal margin broadly and weakly emarginate, dorsal margin very broadly and evenly rounded.

Transtilla with arm well sclerotized, glabrous, approximately one-fifth as long as harpe, widely separated from costal margin, terminating considerably above base of harpe.

Uncus very obscurely bifid. Dorsal aspect: base indistinctly separated from tegumen by narrow area of reduced sclerotization, cephalic margin broadly and deeply emarginate mesad, mesal area glabrous; lateral areas heavily sclerotized, punctate and setose, converging distad and fusing into bases of furcae; angle of bifurcation extremely acute and obscure, located slightly basad of midpoint of main uncal process; furcae of medium length, approximate, appearing as single process (especially in untreated specimens), heavily sclerotized, directed caudad and slightly ventrad, lateral margins punctate and setose, apices acute and approximate.

Gnathos fused, rather broad, directed caudoventrad, dorsal portion scobinate, lateral margins well sclerotized, converging slightly to broadly and evenly rounded apex.

Anellus membranous, unarmed, juxta absent.

Aedeagus of medium length and width, approximately four-fifths as long as harpe, cylindrical, asymmetrical, basal three-fourths sublinear in all aspects, apical fourth evenly curving ventrad, basal fourth broadly expanded laterad and terminating in pair of subdigitate lateral processes; apical third opening broadly ventrad and

consisting of several irregular, flattened, platelike, very weakly sclerotized, dorsolateral areas; dorsodextral area near apex armed with minute, acute, well sclerotized spine superficially appearing as cornutus of adjacent vesica; narrow area along dorsal margin of apical half of aedeagus armed with 8–10 extremely small and indistinct spines directed distad.

Vesica rather large, membranous, densely infolded, with subdigitate sinistral expansion. Portion of membrane within aedeagus armed with at least two cornuti: apical cornutus located just inside apical opening of aedeagus and embedded in membranous ventral pouch, rather elongate and slender, well sclerotized, apex acute, directed distad; basal cornutus located within basal half of aedeagus and embedded in membranes, larger than apical cornutus, well sclerotized, directed distad, otherwise indistinct because of its location.

This membrane enclosed within the aedeagus may represent the penis or perhaps a portion of the vesica retracted into the aedeagus. In the latter case, this might occur normally in the insect or it might have been caused inadvertently during the process of dissection. In any event, the flexibility of this membrane indicates that these cornuti could easily be extruded through the apical opening of the aedeagus during copulation, and thus appear as armature of the vesica.

TYPE.—Type ♂ (type no. 9905) in the U.S. National Museum.

TYPE LOCALITY.—Hot Springs, Ariz.

DISTRIBUTION.—Southwestern United States. Arizona, New Mexico, and (?) Texas.

SOURCES OF MATERIAL.—California Academy of Sciences (1 ♀); New Mexico College of Agriculture and Mechanic Arts (1 ♂).

SPECIMENS EXAMINED.—2 (1 ♂, 1 ♀), from 2 localities:

NEW MEXICO: State College, Dona Ana Co., ♂ (July 8, 1945, collector unknown); Busck, in his original description, also reported this species from Las Cruces, Dona Ana Co., New Mexico. TEXAS: Terlingua, Brewster Co., ♀ (May 6, 1927, J. O. Martin).

REMARKS.—This small species, apparently quite rare in collections, undoubtedly ranges southward into Mexico. The ♀ listed above has been only tentatively associated with the ♂ of *punctellus*.

A. punctellus is generally related to *furcatus*, the two comprising a small species group in which the relationship is not exceedingly close. These two species may be easily distinguished from each other, as well as from the other acrolophids here treated, by their distinctive harpes and aedeagi.

I have examined the type ♂ specimen at the U.S. National Museum. It is labeled "*Neolophus punctatus* Busck, type no. 9905, Hot Springs, Arizona, June 27." Its genitalia had been removed and mounted on

a slide by Busck on February 10, 1935. My examination of this preparation further confirmed the identity of this species.

28. *Acrolophus cockerelli* (Dyar)

FIGURES 139–143

Eulepiste cockerelli Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 307, Oct.—Dyar, 1903, List North Amer. Lep., p. 577, no. 6581.

Acrolophus cockerelli Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8167.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9553.

Dyar's original description follows:

Eulepiste Cockerelli.—Palpi upturned in front of the head, free, as high as the vertex; male antennae simple, slightly serrated toward the ends; veins 8 and 9 of fore wing stalked; thorax and fore wings dark brown-gray, somewhat grizzled or mottled with darker and with an obscure darker spot at the end of the cell. Hind wings dark brown; abdomen gray-brown; expanse 16 mm. One male, Mesilla Park, New Mexico, at light, July 8th (T. D. A. Cockerell); U.S. Nat. Mus., Type No. 4417.

Prior to the above description, Dyar said of the genitalia of *cockerelli*:

Uncus single, its opposing lower limb nearly as long as the upper and stouter. Harpes nearly flat, the ends bent inward, rounded.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen glabrous; lateral arm elongate, slender, sinuate, narrowing to point of articulation with vinculum; dorsal area narrow, with mesal portion curving caudad.

Harpe simple. Lateral aspect: costa and sacculus fused, enlarged, broad, comprising approximate basal three-fifths of harpe, glabrous except for punctate and setose ventrocaudal margin of sacculus, broadest in apical third, evenly narrowing to narrow base. Cucullus rather indistinctly fused with costa and sacculus, rather short, broad, rectangular, comprising approximate apical two-fifths of harpe, directed considerably ventrad, not curved mesad, ectal surface subglabrous, ental surface punctate and setose, dorsal and ventral margins usually linear and parallel, apex truncate or nearly so.

Transtilla with arm of medium length, glabrous, sublinear, evenly narrowing to acute apex, diverging from margin of costa, failing to reach base of harpe by half to its own length.

Uncus simple, approximately same as those of *pseudohirsutus* and *kearfotti*. Dorsal aspect: base small, subtriangular, set off from tegumen by areas of reduced sclerotization, sparsely punctate and setose, laterobasal margins rounded, lateral margins converging distad into uncal process. Uncal process indistinctly fused with basal area, tubular, rather elongate and slender, sparsely punctate and setose, direc-

ted caudad and curving slightly ventrad, gradually narrowing distad to acute apex.

Gnathos fused, distinctive; elongate, flattened, directed caudoventrad, with mesal area of reduced sclerotization; lateral margins heavily sclerotized, linear, evenly converging distad to narrow but rounded apex; apex usually thickened dorsoventrad and armed at dorsolateral angles with pair of small, acute, dentate, somewhat divergent processes, each sometimes followed basad by 2–3 similar but smaller processes.

Anellus large, membranous, unarmed, juxta absent.

Aedeagus rather elongate, quite slender, cylindrical, subsymmetrical, glabrous, sublinear in all aspects, of almost constant width throughout except for moderately expanded base and slightly expanded apex, apical opening subcircular.

Vesica membranous, large, cylindrical, broader than and approximately as long as aedeagus, commonly spiriform, armed at extreme apex with single cornutus. Cornutus similar to that of *pyramellus*; basal half large, conical, moderately sclerotized, weakly costate, tapering distad; apical half quite slender, more heavily sclerotized, slightly curved, tapering to finely acute apex.

Type.—Type ♂ (type no. 4417) in the U.S. National Museum.

Type locality.—Mesilla Park, Dona Ana Co., N. Mex.

Distribution.—Western United States. Utah, Arizona, New Mexico and Texas.

Sources of material.—American Museum of Natural History (3 ♂♂); California Academy of Sciences (11 ♂♂, 1 ♀); Carnegie Museum (1 ♂); Cornell University (2 ♂♂); Illinois State Natural History Survey (1 ♂); U.S. National Museum (1 ♂); University of Kansas (1 ♂).

Specimens examined.—21 (20 ♂♂, 1 ♀), from 15 localities:

Arizona: Fort Grant, ♂ (Pinaleno Mountains, July 13–19, 1917, Cornell University Biological Expedition); Fort Huachuca, 2 ♂♂ (Aug. 3, 1924, J. O. Martin); Gila Bend, 4 ♂♂ (Aug. 20, 1924, E. P. Van Duzee and J. O. Martin); Huachuca Mountains, ♀ (Carr Canyon, Aug. 4, 1924, J. O. Martin); Paradise, Cochise Co., ♂ (July, O. C. Poling); Patagonia, ♂ (Aug. 2, 1924, E. P. Van Duzee); Pima Co., "30 miles east of Quijotoa," ♂ (Aug. 28–29, 1927); Pima Co., "16 miles south of Tucson," ♂ (Aug. 11, 1924, J. O. Martin); Pinal Co., "6 miles south of Florence," ♂ (July 23, 1924, E. P. Van Duzee); San Bernardino Ranch, Cochise Co., ♂ (Aug., elevation 3750 feet, F. H. Snow); Santa Catalina Mountains, ♂ (Aug. 13, 1924, gnathos atypical, E. P. Van Duzee), ♂ (Sabino Canyon, Aug. 13, 1924, gnathos atypical, Van Duzee), ♂ (Pepper Sauce Canyon, Aug. 16, 1924, Van Duzee); Superior, ♂ (Boyce Thompson Arboretum, Aug. 2, 1937, gnathos atypical, A. B. Klots). Texas: Locality and date unknown, ♂ ("Tex.," Andreas Bolter collection), ♂ ("Tex.," Henry Edwards collection). Utah: Newton, ♂ (July 12, 1929, H. J. Pack).

REMARKS.—This species, named after T. D. A. Cockerell, undoubtedly ranges southward into Mexico. It is related to those species having short labial palpi, naked eyes, simple antennae with segments encircled by rings of scales, simple uncus, and fused gnathos. It is not closely related to any of the other acrolophids treated in this work, although it exhibits certain affinities with several species. The harpe of *cockerelli* is somewhat similar to those of *pseudohirsutus* and *kearfotti*, while its aedeagus is perhaps closest in appearance to that of *pyramellus*. However, *A. cockerelli* may be easily distinguished from its various congeners by its characteristic harpe, gnathos, and vesica. The genital characters of this species are consistent throughout my series representing it.

I have examined the type ♂ specimen at the U.S. National Museum. It is labeled "*Eulepiste cockerelli* Dyar, type no. 4417. (Acc. No. 34904). Mesilla Park, New Mexico, at light, July 8, Ckll." The specimen readily confirms the identity of this species. The characteristic spines of the gnathos are very well developed in the type specimen.

29. *Acrolophus pyramellus* (Barnes & McDunnough)

FIGURES 135–138

Eulepiste pyramellus Barnes & McDunnough, 1913, Can. Ent., vol. 45, no. 12, p. 420, pl. 16, fig. 4, Dec. (fig. cited should read "*Eulepiste pyramellus*, type ♂." It is incorrectly labeled *Eulepiste antonellus*).

Acrolophus pyramellus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8163.—Eyer, 1924, Ann. Ent. Soc. Amer., vol. 17, no. 3, pl. 35, fig. 3. (mislabeled).—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9549.

The original description of Barnes & McDunnough follows:

Eulepiste pyramellus—♂.—Antennae annulate; palpi rather smooth, upturned to above front, but not appressed; front pale ochreous, thorax darker; primaries an admixture of pale gray and brown scales, maculation very indefinite and indistinct, in well-marked individuals consisting of a brownish blotch in cell near base, another at end of cell and a third midway between these two above inner margin, these latter are at times connected outwardly by a whitish oblique waved line which is usually more or less obsolete; indistinct costal and terminal dark dots; secondaries and underside unicolorous smoky brown. Expanse 23 mm.

Habitat: Pyramid Lake, Nevada. 4 ♂. Type, Coll. Barnes.

The species appears to be intermediate between *hirsutus* Bsk. and *occidens* Bsk.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen glabrous; lateral arm elongate, very slender; dorsal area broad, not separated along meson.

Harpe simple. Lateral aspect: costa and sacculus indistinctly fused, broadest near point of attachment of arm of transtilla, gradually narrowing to base, basal extremity narrowly rounded, glabrous except for sparsely setose ventrocaudal margin of sacculus. Cucullus indis-

tinctly fused with costa and sacculus, comprising somewhat less than apical half of harpe, approximate apical two-thirds curving considerably ventrad, rather weakly constricted near base, approximate apical third markedly expanded ventrad, dorsal margin and apical third sparsely punctate and setose; apex with broad and shallow emargination, with dorsal extremity nearly squared to rather narrowly rounded, ventral extremity broadly rounded.

Transtilla with arm short, slender, glabrous, basal portion divergent from and apical portion parallel with dorsal margin of costa, apex acute, failing to reach basal extremity of harpe by approximately its own length.

Uncus simple. Dorsal aspect: base small, sparsely setose near lateral margins to entirely glabrous, completely and distinctly set off from tegumen by areas of reduced sclerotization, cephalic margin broadly and deeply emarginate mesad, lateral margins sinuate and converging distad into base of uncal process; uncal process elongate, slender, tubular, with lateral margins heavily sclerotized and sparsely setose, basal third curving somewhat ventrad, apical two-thirds linear, apex acute.

Gnathos fused into flattened flap directed ventrocaudad, elongate, of medium width, lateral margins heavily sclerotized and glabrous, mesal area weakly sclerotized and minutely pitted toward apex, apex broadly rounded.

Anellus large, membranous, unarmed, juxta absent.

Aedeagus elongate, slender, asymmetrical, cylindrical, glabrous, linear in dorsal and ventral aspects, approximate apical fourth curving considerably ventrad in lateral aspect, base irregularly expanded, apex weakly expanded and irregularly opening.

Vesica rather small, bulbous, membranous, armed at apex with prominent cornutus directed distad. Cornutus with basal portion large, moderately sclerotized, tapering distad; apical portion heavily sclerotized, tapering to acute apex.

TYPE.—Type ♂ (type no. 61452) in the U.S. National Museum.

TYPE LOCALITY.—Pyramid Lake, Nev.

DISTRIBUTION.—Western United States. Nevada, California, and Arizona southward into Mexico.

SOURCES OF MATERIAL.—American Museum of Natural History (5 ♂♂); California Academy of Sciences (2 ♂♂); Cornell University (23 ♂♂).

SPECIMENS EXAMINED.—30 (all ♂♂), from 6 localities:

ARIZONA: San Carlos, 21 ♂♂ (May 12–13, 1918, J. Ch. Bradley). CALIFORNIA: Palm Springs, Riverside Co., ♂ (April 26, 1944, Fred H. Rindge collection); Rancho La Sierra, Riverside Co., 3 ♂♂ (May 17 and 21, 1941, Fred H. Rindge collection), ♂ (May 16, 1947, Rindge collection); Victorville, 2 ♂♂ (April 30, 1918, J. Ch. Bradley); White Mountains, Inyo Co., ♂ (Silver Canyon,

May 11, 1926, J. O. Martin). MEXICO: Angeles Bay, Gulf of California, ♂ (May 4, 1921, abdomen and genitalia missing, E. P. Van Duzee).

REMARKS.—This species was presumably named after its type locality. *A. pyramellus* is related to those species having short labial palpi, naked eyes, simple antennae with segments encircled by rings of scales, simple uncus, and fused gnathos. It may be easily distinguished from the other members of the genus by its characteristic harpe and aedeagus. The genital characters of *pyramellus* are consistent throughout my series of thirty specimens.

I have examined the type ♂ specimen at the U.S. National Museum. It has recently been assigned a type number during the course of this revision. It is labeled "*Eulepiste pyramellus* B. & McD., Pyramid Lake, Nevada." This specimen exhibited a moderate amount of geographical variation in comparison to the material I had previously seen for this species. Dr. Clarke removed the genitalia of the type for me and the identity of *pyramellus* was thus confirmed. In addition, my examination of a slide preparation of the ♂ genitalia of a "cotype," also from Pyramid Lake, further confirmed the identity of this species.

Contrary to the brief comment accompanying the original description of this species, *pyramellus* is neither closely related to nor an intermediate between *hirsutus* (*pseudohirsutus*) and *occidens*. In the past, Busck and other workers have sometimes confused *pyramellus* with *kearfotti*.

30. *Acrolophus laticapitanus* (Walsingham)

FIGURES 144–149

A group of 69 male specimens, 59 from California and 10 from Arizona, presents a complex of four subspecies and one form. Involved in this complex are *laticapitanus*, *unistriganus*, *occidens*, *flavicomus*, and *leopardus*, all of which have been considered as distinct species up to the present time. There has been very little previous suggestion that any of these "species" are even closely related. Information received from the British Museum regarding *laticapitanus* and a study of the type material representing the other four "species" at the U.S. National Museum show that *unistriganus* is a synonym of *laticapitanus* and that *flavicomus* is a synonym of *occidens*. In addition, *leopardus* should be considered a form of *occidens*, since both occur in the same locality. Lastly, added to the complex are two subspecies, *heinrichi* and *clarkei*, described below as new.

The entire group is bound together by almost identical genital structure, except for the rather unstable cucullus of the harpe. Even the most specific organs, the aedeagus and its unarmed vesica (fig. 146), exhibit but little variation throughout the complex. The aedeagus may show some variation in respect to curvature and sinua-

tion in lateral aspect. If the aedeagus, vesica, or any of the other genital structures, except the cucullus, do possess usable characters for separation, they are too subtle for detection by the methods employed in this problem.

However, the variation found in the cucullus seems to exceed the limits of intraspecific variation observed in the other species of this family. Although the cucullus is somewhat unstable in any one series, its major variations enable one to separate the entire group into four fairly distinct series. Likewise, size, wing pattern, and ground color, although variable in some cases, enable one to divide the group into three rather definite series. The eyes are the same throughout the group and the labial palpi are of little value in the separation of series. However, the antennae aid in separating at least one series from the others. These differences in habitus and antennae also seem to exceed expected intraspecific variation. Using all of the above-mentioned differences, either singly or in combination, the entire complex may be separated into five reasonably distinct, although very closely related, series.

Geographical separation is responsible for most of the differences among these series, although it is not involved in the occurrence of two of the series in the same city. Thus, it is best to consider the material at hand as a complex composed of four subspecies and one form which offer rather poor characters for separation. Each of these subspecies exhibits variation or instability in one or more characters, and more information is needed, including larger collections over larger areas and studies of the immature forms and life histories, before this complex can be properly understood. Additional material may disclose better characters for separation, or it may show that geographical separation does not actually exist and that gradual and complete intergradation occurs between two or more of these subspecies.

The original group of 69 male specimens was divided into five series representing the four subspecies and one form now under consideration. The first series, consisting of 33 specimens from Oroville, California, agrees reasonably well with British Museum photographs of the type ♂ adult and genitalia of *laticapitanus* which was described from approximately the same area in northern California by Walsingham in 1884. In addition, this series agrees closely with Walsingham's original description of *laticapitanus*. The second series, 16 specimens from San Diego and Alpine, Calif., agrees with Busck's (1910) description of *occidens* from San Diego, approximately 550 miles south of Oroville. This series also agrees with the type material representing *occidens* in the U.S. National Museum. A third series, consisting of 10 specimens, also from San Diego, agrees reasonably

well with Busck's (1910) description of *leopardus* from that city, as well as with the type material representing *leopardus* in the U.S. National Museum. A fourth series, five specimens from Pinal and Pima Counties, Arizona, does not agree with the types of any of the previously described species. This series, described below as a new subspecies, *heinrichi*, agrees very closely with Dyar's (1903b) description of *unistriganus* from Coconino County, Arizona. However, Dyar's type material representing *unistriganus* has proved to be *laticapitanus*, thus extending the range of the latter 6--700 miles southeastward into north central Arizona. This places the type locality of *heinrichi* about 350 miles southeast of that of *occidens* and *leopardus* at San Diego, approximately 800 miles southeast of that of *laticapitanus* in northern California, but only about 200 miles south of the southernmost range known for *laticapitanus*. The fifth and last series, consisting of five specimens from Cochise County, Arizona, also does not agree with any previously described species. It is described below as a new subspecies, *clarkei*. Cochise Co. borders Pima Co. on the east and occupies the southeast corner of Arizona. Thus, the type locality of *clarkei* is fairly near that of *heinrichi*.

In all the members of this complex the eyes are large, protruding, devoid of setae and lashes, and offer no character for separation. The labial palpi are short, upcurved, and with the basal segment the largest. They are slightly longer in *occidens* and *leopardus*. The antennae are simple with the segments stout and closely set together. Each segment is furnished with one complete ring of scales as well as a second partial set on the dorsal surface giving each antenna a continuous, overlapping, dorsal covering of scales from base to apex. In *laticapitanus* each antennal segment bears two complete rings of scales, a character consistently enabling one to distinguish it from the other members of the complex. In regard to size, *occidens* is generally the largest of the group with a wing expanse ranging from 20 to 24 mm., although one dwarf specimen of less than 18 mm. easily intergrades in size with the other members. These are all quite small and range from 14 to 21 mm. in expanse.

The color patterns of all the members are given with reasonable accuracy and detail in the original descriptions (q.v.) and need no further elaboration here. In *laticapitanus*, *heinrichi*, and *clarkei* essentially the same, simple, consistent color pattern is exhibited. In *leopardus* the color pattern tends to be slightly more complex and variable. The *occidens* series exhibits the most complex and variable coloration, and its wing pattern permits it to be separated into at least two groups, the less frequent of which occurs in both Alpine and San Diego, California. In general habitus, *laticapitanus*, *heinrichi*, and *clarkei* resemble one another and are quite distinct from *occidens*

TABLE 2.—*Table for separation of* laticapitanus *complex.*

	laticapitanus	*occidens*	*leopardus*	*heinrichi*	*clarkei*
Range	Shasta, Lake, and Butte Cos., Calif. Coconino Co., Ariz.	San Diego and Orange Cos., Calif.	San Diego Co., Calif.	Pima and Pinal Cos., Ariz.	Cochise Co., Ariz.
Antenna	Each segment with two complete rings of scales.	Each segment with only one complete ring of scales.	Each segment with only one complete ring of scales.	Each segment with only one complete ring of scales.	Each segment with only one complete ring of scales.
Wing expanse	16–21 mm.	18–24 mm.	17–20 mm.	17–18 mm.	14–16 mm.
Color pattern (see original descriptions)	About same as that of *heinrichi* and *clarkei*. Stable.	Distinct from those of others, but quite variable.	Closest to that of *laticapitanus*, but fairly distinct. Rather variable.	About same as that of *laticapitanus* and *clarkei*. Stable.	About same as that of *laticapitanus* and *heinrichi*. Stable.
Ground color of wings	Pale yellow forewings contrasting with dark hindwings.	But little contrast between dark forewings and hindwings.	Grayish white forewings contrasting with dark hindwings.	Pale yellow forewings contrasting with dark hindwings.	Pale yellow forewings contrasting with dark hindwings.
Cucullus of harpe	First type (figs. 144, 145). Somewhat variable. Genitalia same as those of *occidens*.	First type (figs. 144, 145). Somewhat variable. Genitalia same as those of *laticapitanus*.	Second type (fig. 147). Fairly stable. Closely related to first type.	Third type (fig. 148). Somewhat variable, but quite distinct from all others.	Fourth type (fig. 149). Somewhat variable, but quite distinct from all others.

and *leopardus* in possessing pale yellow forewings contrasting with dark hindwings. In *leopardus* the grayish white ground color of the forewings contrasts with the dark hindwings. In *occidens* there is very little contrast in ground color between the forewings and hindwings, both of which are rather dark.

In regard to the genitalia, and specifically in regard to the form of the cucullus of the harpe, there are four variable types. The first type is exhibited by *laticapitanus* and *occidens* which have an identical genital structure (figs. 144, 145, 146). The cucullus is quite variable, differing as much within either of the two subspecies as it does between them. The second type of cucullus occurs in *leopardus* (fig. 147). Here, the shape of the cucullus is fairly stable, although it is obviously closely related to the first type. A third type, found in *heinrichi* (fig. 148), is quite distinctive and easily permits one to separate this subspecies from the others. In this case, the cucullus is unstable, varying in each of the five specimens on hand, although none of its variations approaches those found among the other subspecies. The fourth type of cucullus, exhibited by *clarkei* (fig. 149), is also distinctive but variable. In *heinrichi* and *clarkei* the cucullus shows a tendency toward the development of the dorsal portion of the apex, while in the other subspecies the cucullus exhibits a ventral development of the apex with a corresponding reduction or shortening of the dorsal portion.

The two members of this complex which may most likely intergrade are *occidens* and its form, *leopardus*. At least one specimen has the general size and color pattern of *occidens* but a cucullus shaped like that of *leopardus*. This would indicate that either the habitus, cucullus, or perhaps both tend to intergrade between these two. It is curious that Busck, who described both at the same time with one following the other on the same page, failed to indicate their close relationship. Instead, he related *occidens* to *kearfotti* (Dyar) and *leopardus* to *punctellus* (Busck).

Key to Subspecies of the *laticapitanus* Complex

(Based on Males)

1. Each antennal segment with two complete rings of scales.
   30. laticapitanus (Walsingham)
   Each antennal segment with only one complete ring of scales 2
2. Forewings grayish white or dark; cucullus of harpe of first (figs. 144, 145) or second (fig. 147) type, with dorsal portion of apex considerably reduced and ventral portion correspondingly produced distad 3
   Forewings pale yellow; cucullus of harpe of third (fig. 148) or fourth (fig. 149) type, with dorsal portion of apex developed further distad than ventral portion 4

3. Larger, mostly 20–24 mm. in expanse; but little contrast in ground color between dark forewings and hindwings; cucullus of first type (figs. 144, 145), with ventral margin concave . . . . . **occidens** Busck

Smaller, 17–20 mm. in expanse; grayish white ground color of forewings contrasting with dark hindwings; cucullus of second type (fig. 147), with ventral margin convex . . . . . **occidens,** form **leopardus** Busck

4. Cucullus of third type (fig. 148), rather slender, sublinear, margins subparallel, apex subtruncate . . . . . **heinrichi,** new subspecies

Cucullus of fourth type (fig. 149), broadly and unevenly expanded, apex broadly and unevenly rounded . . . . . **clarkei,** new subspecies

30a. *Acrolophus laticapitanus laticapitanus* (Walsingham), new combination

Pseudoconchylis laticapitana Walsingham, 1884, Trans. Ent. Soc. London, p. 133, April.—Smith, 1891, List Lep. Bor. Amer., p. 90, no. 4770.—Dyar, 1903, List North Amer. Lep., p. 488, no. 5469.—Busck, 1907, Journ. New York Ent. Soc., vol. 15, no. 1, p. 20.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 377.

Phalonia unistrigana Dyar, 1903, Proc. Ent. Soc. Washington, vol. 5, p. 232, Feb. (New synonymy.)

Pseudoconchylis (*Phalonia*) *unistrigana* Busck, 1907, Journ. New York Ent. Soc., vol. 15, no. 1, p. 20.

Acrolophus laticapitanus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8176.—McDunnough, 1939, Check List Lep. Can. & U. S. Amer., p. 103, no. 9562.

Acrolophus unistriganus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8178.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9564.

Walsingham's original description of *laticapitanus* follows:

Pseudoconchylis laticapitana—Head whitish ochreous. Palpi the same, sprinkled with brownish scales externally. Antennae pale ochreous. Fore wings whitish ochreous, mottled and speckled with ochreous greyish brown and brown scales. Brown dots and spots are distributed around the costal and apical margins, the extreme base of the costa being also brownish. There is an ill-defined oblique fasciaform shade commencing below the outer third of the costal margin, and terminating in an aggregation of brown scales on the fold; the brown scales appear to be very fugitive, and in specimens only slightly worn are scarcely noticeable. Hind wings and abdomen pale brownish. Expanse, 17 mm.

Both sexes obtained in Lake County and Shasta County, California, June 25th to July 10th, 1871, by myself.

Male genitalia identical with those of *occidens*, described below.

Remarks.—The type material, including the holotype ♂, is in the British Museum (Natural History). Mr. Tams has sent me photographs labeled "*laticapitanus* Wals., type," which show an adult ♂ and its genitalia. Both of these agree with a series of 33 ♂ ♂ received on loan from the California Academy of Sciences. These were collected by H. H. Keifer at Oroville, Butte Co., Calif., on the following

dates: June 20, 1925 (1 specimen); May 29, 1926 (24 specimens); June 25, 1927 (4 specimens); July 19, 1927 (4 specimens). Butte County is near Lake and Shasta Counties in northern California. I have not seen the ♀ of *laticapitanus*.

Walsingham placed his original description of *laticapitanus* directly beneath that of his new genus, *Pseudoconchylis*, and it is to be assumed that he intended the former to be the type species of the latter. It is interesting to note that he originally placed them in the Tortricidae, subfamily Conchylinae. In Dyar's list of 1903, they also appeared in the Tortricidae, but in the subfamily Phaloniinae. Busck (1907) stated: "*Pseudoconchylis* Walsingham does not belong in the Phaloniinae where it was originally placed and has since been retained in our lists. It is a genus of the Tineidae."

This subspecies has a synonym in *unistriganus* of which Dyar's original description follows:

Phalonia unistrigana—Wings elongate and rounded, palpi short. Ground color white, over-washed on the fore wings irregularly with faint ocherous, the white remaining in patches in and below cell, on internal margin and in a transverse band at outer third of wing. A narrow, broken, oblique black-brown line, directed from middle of inner margin to outer third of costa, not reaching inner margin, broken centrally, the lower part forming a rounded bar, the upper part more diffuse; a series of diffuse, irregular, dark dots in apical portion, in some specimens confined to apical margin, in others spread as far as tornus and situated on white ground color. Hind wing dark gray, fringe paler except at anal angle. Expanse, 18–22 mm.

Three ♀♀, June 9 (Williams, Arizona, Schwarz and Barber). Also a male from Flagstaff, Arizona. (Schwarz and Barber).

Type.—No. 6741, U.S. National Museum.

Remarks.—After transferring *Pseudoconchylis* from the Tortricidae to the Tineidae, Busck (1907) stated:

Phalonia unistrigana Dyar is also a tineid and belongs to this genus. It is exceedingly close to if not identical with *laticapitana*, Walsingham; but considering the different localities it will be safer to retain it as distinct specifically until more material is at hand or the life history is worked out.

The specimens mentioned above by Dyar are at the U.S. National Museum. The holotype is a ♀ lacking both head and abdomen and thus can not be positively associated with any ♂ of the several subspecies of the *laticapitanus* complex. However, of Dyar's two remaining "♀ cotypes," one is actually a ♂. Its genitalia, removed and mounted on a slide by August Busck on Oct. 8, 1933, show it to be *laticapitanus*. Examination of the genitalia of Dyar's single ♂ from Flagstaff, Arizona, showed it to be *laticapitanus*, also. Both of these ♂♂ have the typical double ring of scales on each antennal segment. Several U.S. National Museum slides of ♂ genitalia labeled "*unistriganus*" also proved to be *laticapitanus*.

30b. *Acrolophus laticapitanus occidens* Busck, new combination

FIGURES 144–146

Acrolophus occidens Busck, 1910, Proc. Ent. Soc. Washington, vol. 11, no. 4, p. 186, Jan.; 1912, Rep. Laguna Marine Lab., vol. 1, p. 168.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8165.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9551.

Acrolophus flavicomus Busck, 1912, Rep. Laguna Marine Lab., vol. 1, pp. 168–169, May.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8161.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9547. (New synonymy.)

Eulepiste (?) *occidens* Barnes & McDunnough, 1913, Can. Ent., vol. 45, no. 12, p. 420.

Busck's original description of *occidens* follows:

Acrolophus occidens—Male.—Labial palpi curved, ascending, reaching vertex; first joint as long as second and third together, with evenly rounded brush; second joint also with a brush, continued slightly up over the equally long, smooth third joint. The form of the palpi is intermediate between those described for the genera *Eulepiste* and *Neolophus* Walsingham. The scales of palpi, head, and thorax are brownish fuscous tipped with white. Antennae ochreous fuscous. Fore wings grayish ochreous, overlaid with black, brown, and white scales. There is an oblique, ill-defined dark shade, edged with white, from apical fourth of costa to the middle of dorsum, nearly parallel with the terminal edge; on the apical fourth of the wing are four or five small black dots and outside of these the wing is strongly overlaid with white scales. Hind wings dark fuscous; abdomen dark fuscous, with white bands on the upper side. Legs ochreous, mottled with fuscous and with indistinct black tarsal annulations.

Alar expanse, 22 mm.

Habitat—San Diego, California. May. L. E. Ricksecker, coll. Additional specimens are in the collection of Mr. Kearfott.

Type—No. 12694, U.S. National Museum.

This species is very close in size, pattern, and form of the palpi to *Acrolophus* (*Eulepiste*) *kearfotti* Dyar, but is much paler, lacks the costal black spots, and has the clear cut oblique dash of *kearfotti* replaced by the less defined oblique fascia; the abundant white dusting, especially on the apical part, is also lacking in Dr. Dyar's species. All these color differences might, however, be individual in this group, where the color and markings are quite variable, but the claspers of the male genitalia are very different and the two species are undoubtedly amply distinct.

MALE GENITALIA.—Vinculum typical, but rather short.

Tegumen typical; glabrous to sparsely and weakly punctate, lateral arm narrowing slightly toward point of articulation with vinculum; dorsal area rather broad, unseparated, commonly with subtriangular caudal expansion filling mesal separation in base of uncus.

Harpe simple, somewhat variable, considerably constricted ventrad near center. Lateral aspect: costa and sacculus fused, sparsely and weakly punctate, comprising slightly more than basal half of harpe, broadest distad of center, narrowing somewhat toward rounded base; cucullus large, broad, with marked ventral constriction near base,

sparsely punctate and setose ectad and entad, curving gradually mesad toward apex, broadest distad of center, narrowing dorsad toward apex, apical portion curving somewhat ventrad and approximately half as broad as central portion, ventral margin emarginate and commonly sinuate, dorsal margin markedly expanded near center, apex evenly and rather broadly rounded.

Transtilla with arm of medium length and width, glabrous, subparallel with and rather broadly separated from dorsal margin of costa, terminating subacutely near base of harpe.

Uncus simple. Dorsal aspect: base reduced, separated along meson, separated from tegumen by areas of reduced sclerotization, sparsely punctate and setose, laterobasal margins rounded, lateral margins converging distad into uncal process; uncal process fused with base, elongate, tubular, slender, sparsely setose, curving slightly ventrad toward apex, gradually narrowing to acute apex.

Gnathos fused, rather elongate and narrow, directed ventrocaudad; dorsal surface concave, with apical third rugose; lateral margins parallel, well sclerotized; apex broadly and evenly rounded and with small, weakly sclerotized, ventral lobe or flap.

Anellus membranous, unarmed, juxta absent.

Aedeagus of medium length, rather slender, cylindrical, glabrous, asymmetrical, sublinear to weakly sinuate in all aspects, broadest in basal portion, gradually and evenly narrowing to central portion, center about half as wide as base, apical half of constant width; apex slightly expanded and with small, irregular opening.

Vesica small, membranous, unarmed.

Remarks.—The holotype ♂ and a slide of the ♂ genitalia of a paratype were examined at the U.S. National Museum. In comparison to the material I had previously seen, the holotype exhibited a moderate amount of intraspecific variation in regard to the structure of the cucullus and the wing pattern, but there was no question as to its identity. I have seen only the ♂♂ of *occidens*. These include 16 specimens from San Diego County, Calif. One was taken at Alpine in July 1912 by Geo. H. Field, while the remaining 15 were collected in San Diego by Geo. H. Field and W. S. Wright on the following dates: May 2, 1908; May 6, 16, 22, and June 4, 1911; June 12 and 14, 1912; May 3 and June 4 and 14, 1913. Most of these dates of occurrence for *occidens* are earlier than those of its form, *leopardus*, discussed below. Since *occidens* exhibits essentially the same genitalia as, but is geographically separated from, *laticapitanus*, it should be considered a subspecies of the latter on the basis of the external differences described above.

This subspecies has a synonym in *flavicomus* of which Busck's original description is as follows:

Acrolophus flavicomus—Labial palpi curved, ascending, short, hardly reaching vertex; loosely tufted on first joint and in less degree on second and third joint; light ochreous; terminal joint dark brown above. Head and thorax ochreous brown. Forewings light, ochreous brown with two dark ill-defined streaks, forming an irregular cross; one from the middle of dorsum to costa just before apex; the other from tornus to basal fourth of costa; the latter is often more or less broken up and is easily partly lost in rubbed specimens. Still more easily lost and in fact only preserved in perfect specimens is a series of five undulating lines of white raised scales across the wing; on the fold in the central one of these white lines is an ill-defined black dot and the outer crossline contains two or three small patches of black scales before the terminal edge. Cilia light ochreous. Hindwings dark fuscous. Abdomen dark fuscous. Legs ochreous fuscous with faintly annulated tarsal joints.

Alar expanse, 19 mm.

Habitat—Laguna Beach, Southern California. C. F. Baker, coll. U.S. Nat. Mus. Type, No. 14337.

This species belongs to the group, described under the generic name *Eulepiste* Wlsm. and comes closest to *cressoni* Wlsm. and *maculifer* Wlsm., but is amply distinguished by the ornamentation. The various genera, erected in the family Acrolophidae on the secondary sexual characters of the labial palpi can not be maintained.

Remarks.—The holotype ♂, from Orange Co., Calif., was examined at the U.S. National Museum where Dr. Clarke kindly removed its genitalia for me. It appears to be no more than a minor intraspecific variation of *occidens* from adjacent San Diego Co. The holotype has indications of two rings of scales on each antennal segment and in this respect approaches *laticapitanus*. Hence, *flavicomus* may be considered a partial intergrade between *occidens* and *laticapitanus* with genitalia similar to both, color pattern like the former, and antennae like the latter. Two ♂ paratypes, also collected by Baker at Laguna Beach, were borrowed from the U.S. National Museum for further examination. These also confirmed the sinking of *flavicomus* as a synonym of *occidens*. Contrary to Busck's comment, *flavicomus* does not belong to the *Eulepiste* group, for it is not at all closely related to Walsingham's species, *cressoni* and *maculifer*.

30c. *Acrolophus laticapitanus occidens* form *leopardus* Busck, new combination

Figure 147

Acrolophus leopardus Busck, 1910, Proc. Ent. Soc. Washington, vol. 11, no. 4, pp. 186–187, Jan.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8156.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9542.

Busck's original description of *leopardus* follows:

Acrolophus leopardus—Labial palpi of the same form as in the preceding species (*occidens*); ochreous white, mottled with fuscous, especially exteriorly. Antennae light fuscous. Face and head white. Thorax ochreous white, sprinkled with fuscous. Patagina fuscous. Fore wings ochreous white, dotted with small blackish brown spots in rather regular transverse rows. Across the outer end of the cell is an interrupted, poorly defined blackish brown oblique streak, parallel with the terminal edge; on the apical part of the wing the dark spots are larger and arranged in rows between the apical veins. Hind wings dark fuscous. Abdomen dark fuscous. Legs ochreous, tarsi with black annulations.

Alar expanse, 17 to18 mm.

Habitat—San Diego, California. July. L. E. Ricksecker, coll.

Type—No. 12695, U.S. National Museum.

A small very distinct species nearest to *Acrolophus* (*Neolophus*) *punctatus* (= *punctellus*) Busck, lacking, however, the bluish-black dusting and differing also in the unmottled head and palpi and the spotted wing-pattern.

MALE GENITALIA.—Vinculum typical; consisting mostly of large, subtriangular, rather heavily sclerotized, ventral plate.

Tegumen as in *occidens*.

Harpe simple, slightly variable, considerably constricted ventrad near center. Costa and sacculus approximately as in *occidens*. Cucullus similar to but distinct from that of *occidens*; broadest near apex, gradually narrowing proximad to marked ventral constriction at base, dorsal margin very weakly concave, ventral margin moderately convex; apex subobliquely truncate, with margin weakly concave and sinuate, with dorsal angle nearly squared, with ventral extremity evenly rounded and extending considerably further caudad than dorsal angle.

Transtilla with arm similar to that of *occidens*, but shorter and considerably thicker.

Uncus similar to that of *occidens*, but with base largely fused with tegumen.

Gnathos similar to that of *occidens*, but with apex narrower and slightly upturned.

Anellus as in *occidens*.

Aedeagus similar to that of *occidens*; approximate basal fourth moderately expanded and curving somewhat dorsad, apical three-fourths of nearly constant width, apex deeply cleft.

Vesica as in *occidens*.

REMARKS.—The holotype ♂, collected on July 20, was studied at the U.S. National Museum, where its genitalia were removed for me by Dr. Clarke and its identity confirmed. A slide of ♂ genitalia labeled "*Acrolophus leopardus* Busck—San Diego, Calif.—A. Busck" was also examined at the U.S. National Museum. This further confirmed the identity of *leopardus*. I have not seen the ♀ of *leopardus* but I have ten ♂♂ from San Diego, San Diego Co., Calif., collected by

W. S. Wright on the following dates: June 19 and 22, 1909; June 30, July 1, 3, 24, 30, and August 21, 1911; July 3 (two specimens), 1913.

Busck described *leopardus* immediately after *occidens* in the same article. As it has been shown above, the two are not sufficiently distinct to be considered as separate species. Thus, since *leopardus* occurs in the same area as *occidens*, it should be considered as a form of the latter, rather than a direct subspecies of *laticapitanus*. Contrary to Busck's comment, a comparison of the genitalia indicates that *leopardus* is not especially closely related to *Acrolophus punctellus* (Busck).

30d. *Acrolophus laticapitanus heinrichi*, new subspecies

FIGURE 148

MALE.—Labial palpi ochreous, short, weakly recurved, diverging from head and from each other distad. Eyes large, protruding, without setae or lashes. Antennae simple; segments robust, subglobose, each furnished with one complete ring of ochreous scales. Head, thorax, and forewings pale yellow. Forewing with several, faint, minute, fuscous spots scattered in apical third. Hindwings and abdomen fuscous. Genitalia as in *laticapitanus* except for cucullus of harpe (fig. 148); cucullus somewhat variable but distinctive, only slightly constricted at base, major portion sublinear and rather slender, dorsal and ventral margins weakly sinuate and subparallel, apex subtruncate and with dorsal portion developed slightly to considerably further distad than ventral portion. Expanse: 17–18 mm.

FEMALE.—Labial palpi ochreous, slightly shorter than in ♂, porrect, closely subparallel. Eyes similar to those of ♂, but slightly smaller. Antennae simple; segments more elongate and slender than those of ♂, each almost completely covered by ring of scales. Coloration of head, thorax, wings, and abdomen same as in ♂. Expanse: 20–22 mm.

Holotype ♂, allotype ♀, paratype ♂ and ♀, U.S. National Museum, type no. 61442, all from Baboquivari Mountains, Pima County, Ariz. The holotype ♂ is labeled "Aug." The allotype ♀ has nine, variously sized, pale orange mites attached to its abdomen. In the paratype ♂, the labial palpi are very widely divergent and partially cover the eyes. These four specimens were found in the *laticapitanus* series at the U.S. National Museum. I am also designating as paratypes of *heinrichi* three ♂♂ received on loan from the American Museum of Natural History through the courtesy of Dr. Alexander B. Klots. These were collected by Dr. Klots at Boyce Thompson Arboretum, Superior, Pinal Co., Ariz., August 1–2, 1937. Dr. Klots' specimens agree remarkably well with Dyar's original description of *unistriganus* from Williams and Flagstaff, Coconino

Co., Ariz. However, as I have shown, *unistriganus* is a synonym of *laticapitanus*.

Remarks.—This subspecies very closely resembles both *laticapitanus* and *clarkei* in general appearance and genital structure, but it may be distinguished from the former by its antennae, each segment of which bears only one complete ring of scales, and it may be separated from both by the shape of the cucullus of its harpe. This subspecies is named in honor of Carl Heinrich.

30e. *Acrolophus laticapitanus clarkei*, new subspecies

Figure 149

Female unknown.

Male.—Labial palpi ochreous, short, weakly recurved, gradually diverging from head and from each other distad. Eyes large, protruding, without setae or lashes. Antennae simple; segments robust, subglobose, each furnished with one complete ring of ochreous scales. Head, thorax, and forewings pale yellow. Forewing with faint, irregular, fuscous, diagonal streak near center; apex and outer margin sparsely and minutely dotted with fuscous. Hindwings and abdomen fuscous. Genitalia as in *laticapitanus* except for cucullus of harpe (fig. 149); cucullus somewhat constricted at base, major portion considerably and irregularly expanded, apex very broad and with narrowly rounded dorsal portion developed further distad than broadly rounded ventral portion. Expanse: 14–16 mm.

Five ♂♂ from Paradise, Cochise Co., Ariz., June and August.

Holotype ♂, U.S. National Museum, type no. 61443, collected in August. Of the four ♂ paratypes, two are labeled "Aug.," one "Aug. 16–23," and one "June." One paratype has been retained by the author and the remaining type material has been returned to the U.S. National Museum.

Remarks.—This subspecies bears a very close resemblance to both *laticapitanus* and *heinrichi* in regard to general appearance and genital structure. However, it may be distinguished from the former by its antennae, each segment of which bears only one complete ring of scales, and it may be separated from both by the shape of the cucullus of its harpe. This subspecies is named in honor of Dr. J. F. Gates Clarke.

31. *Acrolophus arcanellus* (Clemens)

Figures 150–157

Anaphora arcanella Clemens, 1859, Proc. Acad. Nat. Sci. Philadelphia, p. 261, Sept.; 1872, Tineina of North Amer., pp. vii, 57–58.—Grote, 1872, Can. Ent., vol. 4, no. 8, p. 143.—Chambers, 1878, Bull. U.S. Geol. & Geogr. Surv. Terr., vol. 4, no. 1, p. 128.—Holland, 1903, Moth Book, pl. 48, fig. 42 (mislabeled "*popeanella*").

Pseudanaphora arcanella Walsingham, 1887, Trans. Ent. Soc. London, pp. 170–171, pl. 8, fig. 25.—Beutenmüller, 1888, Ent. Amer., vol. 4, no. 2, p. 29.—Forbes, 1890, Sixteenth Rep. Ill., pp. 98–100, pl. 6, figs. 2, 3, 5.—Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5066, p. 112.—Dyar, 1895, Can. Ent., vol. 27, no. 1, p. 15; 1900, Can. Ent., vol. 32, no. 10, pp. 310–311 (confused with "*mora* Grt."); 1903, List North Amer. Lep., p. 579, no. 6602; 1903, Can. Ent., vol. 35, no. 3, p. 76.—Forbes, 1905, Twenty-Third Rep. Ill., pp. 44, 95–98, fig. 77.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, pp. 378, 387.

Pseudoanaphora (*Anaphora*) *arcanella* Busck, 1903, Proc. Ent. Soc. Washington, vol. 5, p. 187.

Acrolophus arcanellus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8192.—Forbes, 1923, Lep. New York, pp. 117, 120–121, figs. 87, 91, 93.—Comstock, 1924, Intro. to Ent., p. 611.—Eyer, 1924, Ann. Ent. Soc. Amer., vol. 17, no. 3, p. 315.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 104, no. 9582.

Clemens' original description of *arcanellus* probably did not actually appear in print until sometime in 1860. It is quoted as follows:

Anaphora arcanella—Palpi luteous brown in front, dark brown externally. Thorax dark brown, almost blackish. Fore wings dark brown, with an obscure purplish hue; with luteous brown on the disc and in the fold, interrupted by a blackish brown, nearly square, submedian spot in the fold and a small one near its base of the same hue—sometimes merely a few blackish brown scales—with an irregular blackish brown spot on the end of the disc, and the costa and apical portion of the wing dusted and dotted, sometimes striated with blackish brown. Hind wings dark brown, tinged with blackish. Exp. al. 12 lines (about 25.5 mm.). Female not known.

Clemens mentioned elsewhere in his paper that the labial palpi of *arcanellus* were "ascending, but not recurved," due to the fact that they were shorter than those of the ♂♂ of *popeanellus* and *plumifrontellus*.

Walsingham (1887, p. 171) made the following comments on Clemens' original description of *arcanellus:*

To this may be added:—Antennae slightly serrated towards apex. Fore wings with 12 veins, all separate; apical vein not forked. Hind wings 8 veins, also separate, 7 and 8 parallel. Lateral claspers slender, widening slightly towards their posterior extremities, which are rather square. Uncus double, rather abruptly bent over, but not angulated, the points parallel, separated by about the width of one of them.

At the same time, Walsingham (1887, pl. 8, fig. 25) furnished several illustrations of the ♂ genitalia of this species. These consisted of the uncus in dorsal and lateral aspects and the cucullus of the harpe in lateral aspect.

Beutenmüller (1888) briefly described the ♀ of "*Pseudanaphora arcanella*" as follows:

The ♀ of this species, which has hitherto remained undescribed, differs from the male only in size, and short porrected labial palpi. Expanse of wings 32 mm. Length of palpi 1.50 mm.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen with lateral arm of medium length and width, margins sublinear, strongly narrowing to point of articulation with vinculum; glabrous except for small, punctate, setose, dorsocaudal area; dorsal area broad, glabrous, not separated along meson, with mesocaudal expansion filling broad emargination in base of uncus.

Harpe simple. Lateral aspect: quite slender, approximate apical half directed considerably ventrad; costa and sacculus fused, comprising approximate basal half of harpe, glabrous except for heavily punctate and setose ental area of sacculus terminating subacutely ventrocaudad at base of cucullus, broadest in apical third at point of attachment of arm of transtilla, approximate basal two-thirds considerably narrower, basal extremity subacute; cucullus indistinctly separated from costa and sacculus by areas of reduced sclerotization, comprising apical half of harpe, directed considerably ventrad; approximate basal half very slender, very sparsely punctate and setose; apical half expanded ventrad, at least twice as broad as basal half, heavily punctate and setose ectad and entad, curving strongly mesad in dorsal and ventral aspects; apex broad, rounded.

Transtilla with arm of medium length and width, well sclerotized, glabrous, weakly sinuate, subparallel with dorsal margin of costa, terminating subacutely somewhat distad of basal extremity of harpe.

Uncus bifid. Dorsal aspect: base large, broad, largely set off from tegumen by areas of reduced sclerotization, punctate and setose except for glabrous mesal area; lateral margins well sclerotized, sinuate, rather weakly convergent distad; angle of bifurcation very broad, evenly rounded; furcae of medium length and width, tubular, punctate and setose, gradually narrowing and curving ventrad toward apices, broadly separated, major basal portions divergent, smaller apical portions slightly convergent, apices acute.

Gnathos typically paired, lateral margins and apical portions heavily sclerotized, directed mainly ventrad, apical portions curving somewhat caudad; arms broad, flattened, glabrous to weakly pitted, slightly divergent to strongly overlapping distad, apices very broadly and evenly rounded. In some specimens (fig. 150), combined outlines of uncus and gnathos in lateral aspect resemble semicircle; in others, uncus and gnathos are drawn close together and gnathos extends further caudad than uncus in dorsal and lateral aspects.

Anellus membranous, unarmed, juxta absent.

Aedeagus of medium length, five-eighths to three-fourths as long as harpe, markedly flattened dorsoventrad, broad in dorsal and ventral aspects, slender in lateral aspect, sublinear and asymmetrical in all aspects, glabrous, base unexpanded, approximate basal half tubular, apical half opening broadly dorsad and consisting only of

broad ventral wall; apex slightly narrowed, deeply and usually asymmetrically cleft.

Vesica large, membranous, consisting of several infolded layers, armed with single cornutus; cornutus large, elongate, rather slender, heavily sclerotized, linear, directed distad, base weakly and irregularly expanded, apex acute.

TYPE.—Type ♂ in the Academy of Natural Sciences of Philadelphia.

TYPE LOCALITY.—Not given by author, but presumably Philadelphia, Pa.

DISTRIBUTION.—Central and eastern United States. Nebraska and Texas eastward to New Hampshire and Florida.

SPECIMENS EXAMINED.—174, from 58 localities. The large number of specimens available for study has made it advisable to reduce the distributional data for this common species largely to the localities and months of occurrence:

CALIFORNIA: One ♂, from the American Museum of Natural History, labeled "Mariposa Grove, Calif., Aug. 11, 1916" (this record is very questionable). CONNECTICUT: East River (July); New Haven (June, July); Pleasant Valley (Oct.); South Meriden (July). FLORIDA: Biscayne Bay, Dade Co. (no date); Coral Gables (June); Florida City (March); Miami (Dec.); Orlando (Aug.); Royal Palm Park (Dec.). GEORGIA: Clarke Co. (June); Pomona (June). ILLINOIS: Algonquin (June, July, Aug., at light); Champaign-Urbana (June, July, Oct., both sexes common at light in June and July); Chicago (June); Edgebrook (June, July); Homer Park, Homer (June); McHenry (June); Oregon (July, at light); Palos Park (June and July, at light); Peoria (June, July, Sept., at light); Putnam Co. (June, July); Quincy (May); River Grove (June). INDIANA: Hessville (June and July, 1 ♂ with mites on eyes). IOWA: Des Moines (July). KANSAS: Lawrence (June). LOUISIANA: Alexandria (June); Opelousas (July). MASSACHUSETTS: Woods Hole (June). MISSOURI: Kirkwood (June); St. Louis (June). NEBRASKA: Lincoln (July). NEW HAMPSHIRE: Hampton (June, July). NEW JERSEY: Ramsey (July, Aug.); Union Co. (July); Wenonah (July). NEW YORK: Poughkeepsie (July); West Point (July). Long Island: Orient (Aug.); Prospect Park (July); Richmond Hill (July); Riverhead (June, Aug.). NORTH CAROLINA: Brevard (July); Hendersonville (July); Weaverville (Aug.). OHIO: Bellefontaine (July); Granville (July); Marion (July). PENNSYLVANIA: Allegheny Co. (no date); Butler (July); "Clarksval." (July); Finleyville (June); Hunters Run (July); Oak Station, Allegheny Co. (June); Pittsburgh (no date). TENNESSEE: Locality unknown, 2 ♀♀ (July 3, 1905, W. Osburn). TEXAS: Richmond (Brazos River, June).

REMARKS.—One of the first three acrolophids described from the United States, *arcanellus* is widely distributed throughout essentially the same area in which *plumifrontellus* occurs. It is also fairly common and somewhat variable in coloration. It is interesting to note that *arcanellus*, despite its age, wide range, abundance, and variability, has been described as new only once from America north of Mexico.

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A. arcanellus is not especially closely related to any of the other species treated in this work. It may be characterized, as well as distinguished from the other members of the genus, by the following features: labial palpi of intermediate length, setose eyes, laminate antennae, bifid uncus, and paired gnathos. It is also unique in possessing a prominent tuft of lashes at the anterior margin of each eye. Lastly, the characters of its genitalia are quite distinct from those of its various relatives. The genital structure of *arcanellus* is reasonably consistent throughout my large series of this moth. In general appearance, this species is quite large and very robust.

I have not examined the type specimen of this species. Busck (1903), in his report on Clemens' types of Tineina deposited in the collection of the Academy of Natural Sciences in Philadelphia, tabulated the following information on this type:

Anaphora arcanella Clemens. One type, without abdomen but otherwise in good condition, Clemens' No. 12; alar exp., 29 mm. This species was transferred to the new genus *Pseudoanaphora* by Lord Walsingham. A specimen compared with the type is in the U.S. National Museum. Habitat: Eastern United States.

Darlington, in litt., 1946, has further confirmed the presence of this type at Philadelphia as follows: "*arcanella* Clem. Type. Only partially expanded, abdomen missing, maculation distinct, sex not determined." The combined information that I have been able to gather in regard to *arcanellus* leaves little doubt in my mind as to the proper identity and correct concept of this species. I have carefully checked the U.S. National Museum's series of specimens determined as *arcanellus* and found them to agree with my previous concept of this moth.

Dyar (1900, p. 311) published a paragraph of distributional data for *arcanellus*, listing it from New York, the District of Columbia, Missouri, and Texas.

32. *Acrolophus morus* (Grote)

FIGURES 158–161

Eutheca mora (♀) Grote, 1881, Bull. U.S. Geol. Geogr. Surv. Terr., vol. 6, no. 2, pp. 257–258, Sept.

Sapinella (*Eutheca*) *mora* Kirby, 1892, Syn. Cat. Lep. Het., vol. 1, p. 524, Genus 45, sp. no. 1.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 378.

Pseudanaphora mora Dyar, 1895, Can. Ent., vol. 27, no. 1, p. 15.—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 310 (confused with "*arcanella* Clem.").—Merrick, 1901, Proc. Ent. Soc. Washington, vol. 5, no. 1, p. 40.—Dyar, 1903, List North Amer. Lep., p. 579, no. 6603; 1903, Can. Ent., vol. 35, no. 3, p. 76.

Acrolophus mora Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8195.—Forbes, 1923, Lep. New York, pp. 12, 120–121, fig. 94.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 104, no. 9585.

Grote's original description follows:

Eutheca mora.—♀. I have several specimens of a Psychid (?) form which I cannot find in the books, and in collections the species is always unnamed. The antennae are simple, scaled. Eyes naked; ocelli wanting. Maxillae not perceivable. Labial palpi slight, hairy, ascending, curved. Body slender, sparsely haired. Legs rather stout and long; hind tibiae with two pairs of spurs. Fore wings elongate; costa arched; external margin oblique, even; internal margin rounded at base, retiring before internal angle. Veins 12, simple, cell divided; veins 2, 3, 4, equidistant from the end of median vein. Vein 1 furcate at base. Cell incompletely closed. Veins 5 and 6 nearly equidistant between 4 and 7; 7 from extremity of the vein dividing the cell; 8, 9, 10 near together from upper corner of cell, running to costa before apex; 11 out of subcostal vein very near the base; 12 free. Hind wings 8-veined; veins simple; the cell incompletely closed; vein 2 out of median vein at within outer third; veins tending to be equidistant. The fore wings are ochrey brown, with costal dots noticeable before apices. A pale ochrey shade on internal margin at base, extending upwardly in a triangular manner beyond the middle. This shading is not always defined. A curved discal streak. Hind wings brownish fuscous. Fringes on both wings a little darker; even, concolorous. Beneath much as above; costal region of secondaries ochrey brown. The hairy body parts concolorous fuscous brown; with paler hairs about the head and face. Expanse, 30 mil. Hab.—New York. I have not seen the male. This form has a curious resemblance to *Hepialus*, but the antennae are longer.

Male genitalia.—Vinculum typical, as in other species.

Tegumen glabrous; lateral arm rather slender, weakly sinuate, narrowing to point of articulation with vinculum; dorsal area of medium width, not separated along meson.

Harpe simple. Lateral aspect: slender, approximate basal five-sevenths sublinear, apical two-sevenths curving noticeably ventrad, broadest slightly basad of center; costa and sacculus fused, reduced, rather slender, shortened, comprising approximate basal three-sevenths of harpe, glabrous except for sparsely punctate and setose ventrocaudal margin of sacculus, broadest in apical half, basal half strongly narrowed immediately basad of point of attachment of arm of transtilla, basal extremity subacute; cucullus indistinctly fused with costa and sacculus, comprising approximate apical four-sevenths of harpe; basal half broadest, slightly narrowing distad, sublinear, with dorsal margin sinuate, becoming sparsely punctate and setose distad; apical half slightly narrowed, with dorsal and ventral margins sublinear and subparallel, directed somewhat ventrad, becoming heavily punctate and setose distad especially on ental surface; apex bluntly rounded.

Transtilla with arm rather short, very slender, well sclerotized, glabrous, rather broadly separated from costa, gradually converging distad toward dorsal margin of costa, terminating acutely somewhat distad of basal extremity of harpe.

Uncus bifid. Dorsal aspect: base partially separated from tegumen by lateral areas of reduced sclerotization, rather sparsely punctate,

lateral margins well sclerotized and converging distad; angle of bifurcation broad, rounded; furcae of medium length, rather slender, tubular, converging and curving strongly ventrad toward apices, punctate and setose, basal portions broadly separated, apical portions rather narrowly separated, apices acute.

Gnathos typically paired, directed ventrad but with apical portions curving slightly caudad; arms rather slender, well sclerotized, with apical portions slightly divergent and finely scobinate entad, apices rather narrowly rounded.

Anellus membranous, unarmed, juxta absent.

Aedeagus large, approximately two-thirds as long as harpe, markedly flattened laterad, only about four times longer than broad, asymmetrical; base unexpanded, tubular; approximate apical two-thirds curving considerably ventrad, heavily sclerotized ventrolaterad, opening broadly dorsad; central portion of heavily sclerotized area armed with numerous, minute, acute, spinelike processes directed distad; apex narrowly rounded.

Vesica large, membranous, unarmed.

TYPE.—Type ♀ in the British Museum (Natural History).

TYPE LOCALITY.—"New York."

DISTRIBUTION.—Northern portions of central and eastern United States. Minnesota, Wisconsin, and Illinois eastward to New Hampshire, New Jersey, and North Carolina.

SPECIMENS EXAMINED.—68 (33 ♂♂, 35 ♀♀), from 24 localities (5 ♂♂ and 2 ♀♀ without data):

ILLINOIS: Chicago, ♀ (Oct. 18, 1904); "Northern Illinois," ♂, 3 ♀♀ (no date, Andreas Bolter collection). MASSACHUSETTS (?): ♀ labeled "Cambr. B.," possibly meaning Cambridge, Boston. MINNESOTA: Saint Anthony Park, Minneapolis (?), ♂ (Sept. 27, 1899), ♂, ♀ (Sept. 16, 1900); locality unknown, ♂ ("Minn.," date and collector unknown). NEW HAMPSHIRE: Hampton, ♀ (Oct. 11, 1904, S. Albert Shaw); Nashua, ♂ (Oct. 1900). NEW JERSEY: Alpine, ♀ (Oct. 1918, G. P. Engelhardt); Jamesburg, ♂ (Oct. 12, 1908); New Brunswick, ♀ (Oct. 1, J. A. Grossbeck collection), 2 ♂♂ (Oct. 5, Grossbeck collection); Palisades, ♀ (Oct. 11, 1917, G. P. Engelhardt); Riverton, ♂ (Nov. 5, 1905, Daecke collection); Wenonah, ♀ (Oct. 21, 1905, Daecke collection). NEW YORK: Brooklyn, Long Island, 2 ♀♀ (no date, G. P. Engelhardt); Horseheads, 2 ♀♀ (Oct. 17, 1935 and Oct. 23, 1940, L. R. Rupert); Ithaca, ♀ (Oct. 15, 1882, "Daytime"), ♂ (Oct. 5, 1934, Rehn), ♀ (Sept. 26, 1934, J. G. Franclemont), ♂, ♀ (Oct. 21, 1935, Franclemont), ♂ (Oct. 17, 1936, Franclemont); Yaphank, Long Island, ♂, ♀ (Oct. 12, 1915, G. P. Engelhardt); locality unknown, ♂, ♀ ("N.Y.," Henry Edwards collection). NORTH CAROLINA: Black Mountains, ♂ (1911). PENNSYLVANIA: Jeannette, ♂ (Oct. 11); New Brighton, ♀ (Oct. 26, 1902, H. D. Merrick), ♂ (Nov. 2, 1902, Merrick); Oak Station, Allegheny Co., ♀ (Oct. 8, 1908), ♂ (Oct. 18, 1908), ♂ (Oct. 1, 1911, Fred Marloff); Pittsburgh, ♀ (Sept. 12, 1905), 2 ♂♂ (Sept. 24 and 28, 1905), ♀ (Oct. 1, 1905, Henry Engel), ♂ (Oct. 2), ♂, 3 ♀♀ (Oct. 10); Rockville, 2 ♂♂, 3 ♀♀ (Oct. 13, 1912, E. Daecke), ♂ (Sept. 27, 1914); Roxboro, ♀ (Sept. 25, 1905); Swissvale, ♂, ♀ (Oct. 2), ♂ (date and collector unknown). WISCONSIN: Twin Lakes, ♀ (no date, Ramstadt).

Remarks.—This species, the name of which should be spelled *morus* to agree grammatically with its present genus, is unusual in a number of respects. Of the various acrolophids occurring in America north of Mexico, it is the only valid species originally described entirely from the female. In regard to general distribution, it ranges further northward than any other acrolophid and it undoubtedly will be found to occur in southern Canada, especially in that portion of Ontario south of the forty-fifth parallel. Likewise, *morus* probably has the northernmost type locality of any acrolophid, and it regularly appears in the adult form considerably later in the year than any of its relatives. This species is also unique among the acrolophids found north of Mexico in exhibiting a pronounced sexual dimorphism in coloration. Lastly, the predominance of ♀♀ over ♂♂ in *morus* is quite unusual in collections of the various species of this group.

Some specimens of *morus* are abnormally small. A dwarf ♂ without data, furnished by Dr. C. E. Mickel of St. Paul, Minn., measures only 18 mm. in wing expanse. A small ♀ from Pittsburgh measures less than 24 mm. in expanse. A second ♀, received from the American Museum of Natural History, bears the following data: "From larva on birch. Imago Oct. 20, 1905. Laid eggs when pinned, loosely like Arctiinae (?). Egg white, long, narrow, strongly ridged."

Despite its age, fairly broad distribution, reasonable abundance, variation in size, and sexual dimorphism, *morus* has no synonyms. The material representing this species was received on loan from ten sources. The largest series were furnished by the American Museum of Natural History (6 ♂♂, 8 ♀♀) and the Carnegie Museum (7 ♂♂, 5 ♀♀).

A. morus is not closely related to any of the other acrolophids found in America north of Mexico. It may be characterized, as well as distinguished from the other members of the genus, by the following features: labial palpi of intermediate length, naked eyes, laminate antennae, bifid uncus, and paired gnathos. In addition, its general habitus and genital structure are quite distinct from those of its various relatives. The genital structure of *morus* is consistent throughout my series of this moth.

Mr. Tams of the British Museum (Natural History) has sent a photograph labeled "*mora* Grote, type ♀," showing the pinned adult in dorsal aspect, which unquestionably confirms the identity of this species, the ♀ exhibiting a very distinctive general habitus.

The taxonomic history of *morus* is interesting. Grote's single description represented both his new genus, *Eutheca*, and the latter's type species, *mora* (♀), also new. The generic name, *Eutheca*, was subsequently found to be homonymous with *Eutheca* Kiesenw. (1877, Coleoptera). In 1892, Kirby proposed the new name, *Sapinella*, to

replace Grote's *Eutheca*. Thus, the type of the genus became *Sapinella mora*. It is to be noted that Kirby, following Grote's suspicion, included this genus and species in the family Psychidae.

Dyar (1903, p. 76) discussed this species under the generic name, *Pseudanaphora*, as follows:

> In 1895 Lord Walsingham examined Grote's type in the British Museum, and thought it might be the female of *P. arcanella*, Clem., overlooking the description of the true female of this species by Beutenmüller (Ent. Amer. IV., 29, 1888). I have now before me ten females and eight males of *mora* from localities in New York, Pennsylvania and the District of Columbia, a majority of them taken by Mr. F. A. Merrick, at New Brighton, Pa. (see Proc. Ent. Soc., Wash., V. 40, 1902). There is a marked sexual dimorphism, the male being nearly uniformly blackish, and the female of a light ochreous ground colour. The species is very distinct from *arcanella*.

Thus, Grote (1881) originally described the species as a questionable psychid, Kirby (1892) gave it a new generic name and placed it in the Psychidae, Walsingham (1895) transferred it to the proper group (Anaphorinae) but confused it with an allied species, and finally Dyar (1903) proved its identity and distinctness along with a proper association of the sexes.

33. *Acrolophus forbesi*, new species

FIGURES 162–163

MALE.—Somewhat similar to *piger* in general habitus. Head, labial palpi, and thorax grayish white tinged with fuscous. Labial palpi intermediate in length, recurved back over head and extending to anterior margin of thorax, closely appressed to head and to each other, segmentation obscured by rather dense covering of coarse scales. Eyes large, protruding, rather sparsely furnished with very short setae, moderately lashed. Antennae simple, ochreous, covered dorsad with scales, densely clothed lateroventrad with minute setae, segmental processes robust and set closely together throughout antennae. Forewings grayish brown intricately sprinkled with fuscous, ochreous, and pale red; color pattern quite variable, commonly obscure or reduced. Hindwings and fringes dark brown. Abdomen brown, rather coarsely scaled. Cuculli of harpes with elongate tufts of slender scales. Wing expanse: 15 to 18 mm.

FEMALE.—Coloration similar to that of ♂, pattern variable as in ♂. Labial palpi slightly shorter than those of ♂, directed downward and slightly forward, rather narrowly separated from each other; clothed with elongate, slender scales. Eyes similar to those of ♂ except somewhat smaller. Antennae simple, slender, entirely covered by scales. Forewing commonly grayish-brown with four or five large, grayish white patches; pattern variable, commonly obscure or reduced. Wing expanse: 21 to 24 mm.

MALE GENITALIA.—Vinculum typical, but quite small.

Tegumen glabrous; lateral arm of medium width, narrowing toward base; dorsal area narrowing mesad, with mesal portion curving caudad and filling emargination in base of uncus.

Harpe simple, sublinear and with approximate basal three-fourths very slender in lateral aspect. Costa and sacculus fused, greatly reduced, very narrow, comprising approximate basal three-eighths of harpe, glabrous except for sparsely punctate and setose ventrocaudal margin of sacculus, narrowing slightly to base. Cucullus indistinctly fused with costa and sacculus, elongate, considerably enlarged distad, comprising approximate apical five-eighths of harpe, markedly capitate in lateral aspect, directed slightly ventrad; heavily punctate and setose (especially so distad and on ental surface); apical half directed somewhat mesad, basal third very narrow, central third expanding distad, apical third broadly and evenly expanded and rounded.

Transtilla with arm typical; slightly sinuate, glabrous, terminating subacutely distad of base of harpe.

Uncus simple. Dorsal aspect: base broad, subtriangular, laterobasal angles set off from tegumen, punctate except for glabrous mesal area and lateral margins, lateral margins converging into uncal process. Uncal process fused with basal area, tubular, rather short and stout, sparsely punctate and setose dorsad at base, evenly curving caudoventrad, narrowing to acute apex.

Gnathos fused, moderately sclerotized, glabrous, flattened, directed ventrocaudad, of medium length and width, lateral margins sublinear and subparallel, apex broadly and evenly rounded.

Anellus membranous, unarmed, juxta absent.

Aedeagus short, stout, glabrous, asymmetrical, sublinear in dorsal and ventral aspects, basal and apical portions curving somewhat ventrad in lateral aspect, base unexpanded, basal half cylindrical and of constant width, apical half opening broadly dorsad and consisting of well sclerotized ventral strip evenly narrowing distad to acute apex.

Vesica membranous, of medium size, bulbous, armed dorsad with approximately 15–20 cornuti. Cornuti quite small but distinct, mostly uniform in size, well sclerotized, acute, chiefly located in single row extending along meson or in two parallel rows bordering mesal area of vesica, usually directed distad or nearly so.

Type.—Holotype ♂ and allotype ♀ (type no. 61444) in the U.S. National Museum.

Paratypes (25 ♂♂, 5 ♀♀).—American Museum of Natural History (5 ♂♂, 3 ♀♀); Cornell University (9 ♂♂); U.S. National Museum (3 ♂♂, 1 ♀); Mr. Alex K. Wyatt, Chicago, Ill. (8 ♂♂, 1 ♀).

Type locality.—St. Petersburg, Pinellas Co., Fla. (allotype taken in July, collector unknown).

DISTRIBUTION.—Southeastern United States. Florida, Georgia, and North Carolina.

SPECIMENS EXAMINED.—32 (26 ♂♂, 6 ♀♀), from 7 localities:

FLORIDA: Gainesville, Alachua Co., ♂ (June 3, 1927, traplight, J. S. Rogers), 7 ♂♂ (July 10, 1927, traplight, Rogers); Lake Placid, Highlands Co., 2 ♂♂ (Archbold Biological Station, July 15-31, 1948, A. B. Klots); St. Petersburg, Pinellas Co., ♂ (June 14, 1914, R. Ludwig), ♀ (June 30, 1914, Ludwig), ♀ (July, collector unknown), 3 ♂♂ (date and collector unknown); Winter Park, Orange Co., ♂, 2 ♀♀ (June 1946, A. B. Klots), ♂, ♀ (July 1946, Klots). GEORGIA: Groveland, Bryan Co., ♂ (Cannoche River, July 28, 1913, J. C. Bradley); Screven Co., 8 ♂♂, ♀ (July 10, 1946, A. K. Wyatt). NORTH CAROLINA: Maxton, Robeson Co., ♂ (no date, A. B. Klots).

REMARKS.—Undoubtedly, this species also occurs in South Carolina. It is not closely related to any of the other acrolophids treated here. *A. forbesi* is related to that series of species having shortened labial palpi and a type of antenna in which each segment is clothed only dorsad or dorsolaterad with scales. Specifically, *forbesi* may be distinguished from its relatives by its sparsely setose eyes, simple uncus, and fused gnathos. It may be further distinguished from its congeners by its harpe and aedeagus, the vesica of the latter structure being armed with fifteen to twenty small cornuti. The genital structure of *forbesi* is consistent throughout my series of this rather small species.

This species is named in honor of William T. M. Forbes, Professor of Entomology at Cornell University.

34. *Acrolophus panamae* Busck

FIGURES 164–167

Acrolophus panamae Busck, 1914, Proc. U.S. Nat. Mus. (Pub. no. 2043), vol. 47, p. 66, April (originally described from Panama. New to United States check lists).—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 381.

Busck's original description follows:

Acrolophus panamae—Male.—Labial palpi reaching vertex; first joint long and curved; second and third joints short, erect; first and second joints thickened with appressed scales, slightly projecting at apex, light ochreous gray on their inner side and at apex, dark brown exteriorly; terminal joint flattened, tolerably pointed, blackish brown with extreme tip light ochreous. Face and head light ochreous brown mixed with gray and white scales. Thorax ochreous brown. Forewing light ochreous brown mixed with white, dark brown, and black scales; pattern very poorly defined, but a broad, oblique, dark brown streak may be made out from the middle of the fold to costa just before apex, adjoining the base of which is a large, blackish brown spot on the lower edge of the cell; a series of well defined, blackish brown costal spots and some diffused marginal brown spots on terminal edge. Hindwings dark brownish fuscous. Abdomen dark brown with light ochreous underside and anal tuft. Uncus and lateral claspers slender, curved downward and inward at tip. Legs ochreous on their inner side, dark brown exteriorly; tarsal joints blackish brown with narrow ochreous annulation.

On the underside of the thorax just under the forewing is a large, dense tuft of ochreous gray hairs, which can be erected so as to obscure the sides of the head and the base of the forewings.

Alar expanse.—10–12 mm.

The females which were repeatedly taken in copulation with the males are considerably larger and with more pointed wings and rather lighter in general color. The labial palpi are hardly as long as in the males and more porrected. They have no thoracic tufts.

Alar expanse.—17–21mm.

Habitat.—Alhajuela, Cabima, Trinidad River, Tabernilla, Paraiso, and Corozal, Panama. April, May and June.

Type-specimen.—Cat. No. 16771, U.S.N.M.

In a series of more than sixty males, hardly two are quite alike and the different state of preservation adds much to the variation, but the general habitus, as well as the structural characters, makes it easy to place the species, which appears to be close to *A. ridicula* Meyrick, described from a unique male from Dutch Guiana.

Male genitalia.—Vinculum typical, as in other species.

Tegumen with lateral arm of medium length and width, margins subparallel, sparsely and weakly punctate; dorsal area broad, glabrous, cephalic margin linear (not emarginate), cephalic portion upraised, caudal margin produced caudad to fill mesal emargination in base of uncus.

Harpe simple. Lateral aspect: broadest in area of costa and sacculus giving rise to arm of transtilla. Costa and sacculus fused, broad, narrowing gradually in basal and apical areas, comprising slightly more than basal half of harpe, glabrous except for punctate and setose ventrocaudal margin of sacculus. Cucullus indistinctly fused with costa and sacculus, directed somewhat ventrad, apical two-thirds sparsely and coarsely punctate and setose (especially entad and along margins), mesal portion constricted ventrad, ventral margin thickened and irregular; dorsal margin thin, smooth, and sublinear; apical third slightly expanded; apex broad, with irregular margin, ventral portion evenly rounded, dorsal portion subtruncate.

Transtilla with arm well sclerotized, glabrous, rather broad, less than one-fourth as long as harpe, widely separated from costal margin, terminating a little above base of harpe.

Uncus very obscurely bifid. Dorsal aspect: base separated from tegumen by narrow area of reduced sclerotization, cephalic margin broadly emarginate mesad, mesal area glabrous; lateral areas heavily sclerotized, sparsely punctate and setose, gradually converging distad and smoothly fusing into bases of furcae; angle of bifurcation extremely acute and obscure, located beyond midpoint of main uncal process; furcae short, approximate, appearing as single process (especially in untreated specimens), heavily sclerotized, directed caudad and slightly ventrad, lateral margins sparsely punctate and setose, apices acute and very slightly divergent.

Gnathos fused, rather short and broad, directed caudoventrad, dorsal portion heavily scobinate; lateral margins well sclerotized, evenly converging to broadly rounded apex.

Anellus large, membranous, unarmed, juxta absent.

Aedeagus of medium length and width, somewhat shorter than harpe, cylindrical, asymmetrical, glabrous, sublinear in dorsal and ventral aspects, slightly sinuate in lateral aspect, approximate basal third broadly expanded laterad and dorsad, approximate basal fourth opening broadly dorsad, extremity of base markedly emarginate mesoventrad, apex opening broadly; apical extremity of aedeagus consisting of very slender, weakly sclerotized extension curving gradually ventrad and terminating in rather small, acute, well sclerotized, spinelike process superficially appearing as cornutus of adjacent vesica.

Vesica rather small, membranous; unarmed, but attached to and appearing to bear spinelike process of extension of aedeagus.

TYPE.—Type ♂ (type no. 16771) in the U.S. National Museum.

TYPE LOCALITY.—Cabima, Panama, Central America.

DISTRIBUTION.—Panama northward into eastern United States. North Carolina and New Jersey.

SOURCES OF MATERIAL.—American Museum of Natural History (1 ♂); U.S. National Museum (1 ♂, 1 ♀).

SPECIMENS EXAMINED.—3 (2 ♂♂, 1 ♀), from 2 localities:

NEW JERSEY: New Lisbon, Burlington Co., ♂ (July 17, 1931, at light, E. P. Darlington), ♀ (July 14, 1932, at light, Darlington). NORTH CAROLINA: Maxton, Robeson Co., ♂ (no date, A. B. Klots).

REMARKS.—This small species is recorded here from the United States for the first time. It is not closely related to any of the other acrolophids known to occur in America north of Mexico. *A. panamae* is related to that series of species having shortened labial palpi and a type of antenna in which each segment is clothed only dorsad or dorsolaterad with scales. Aside from these general features, *panamae* may be distinguished from the other members of the genus by its naked eyes, fused gnathos, and very obscurely bifid uncus. It may be further distinguished from its congeners by its harpe and aedeagus, the vesica of the latter structure being unarmed. The genitalia of *panamae* are suggestive of those of *furcatus*, especially in regard to their respective unci and aedeagi. However, the harpes and antennae of the two species are quite distinct.

I have examined the type ♂ specimen at the U.S. National Museum. It is labeled "*Acrolophus panamae* Busck, type no. 16771, Cabima, Panama, May 1911, August Busck." My examination of a slide preparation of the ♂ genitalia of a "cotype" of *panamae* from Río Trinidad, Panama, further confirmed the identity of this species.

It is apparently quite common in Central America, the U.S. National Museum having numerous specimens.

35. *Acrolophus juxtatus*, new species

FIGURES 168–171

Female unknown.

MALE.—Head, labial palpi, antennae, and thorax ochreous tinged with fuscous. Labial palpi shortened, partially recurved over head and extending well above and beyond antennal bases, rather densely clothed with slender scales, basal portions narrowly separated from each other but closely appressed to head, apical portions closely appressed to each other and extending above head, apical segments becoming increasingly fuscous distad. Eyes moderately large and protruding, naked, rather heavily lashed. Antennae strongly bipectinate, densely covered dorsad by scales; segmental processes slender and broadly separated from one another in lateral aspect, free of scales but finely ciliated. Forewings brown with dark brown or fuscous markings consisting of short bars along costal margin, large spot at outer end of cell, and patch bordered by two paler areas on and beneath center of fold. Color pattern of forewings somewhat variable. Hindwings and fringes brown. Abdomen covered with pale brownish scales, these in turn largely covered by elongate hairs of similar color. Wing expanse: 22 mm.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen glabrous; lateral arm with central portion broad, evenly narrowing toward extremities; dorsal area of medium width, caudal margin indistinctly fusing mesad with base of uncus.

Harpe simple. Lateral aspect: costa and sacculus fused, comprising somewhat less than basal two-thirds of harpe, glabrous except for elongate setose area along ventrocaudal margin of sacculus, central portion broadly and evenly expanded ventrad, basal third evenly narrowing to slender basal extremity, apical third somewhat narrowed distad. Cucullus partially separated from costa and sacculus by ventral constriction and small area of reduced sclerotization, directed considerably mesad and ventrad, heavily punctate and setose ectad and entad except for small glabrous area at base, approximate basal fourth somewhat narrowed ventrad, apical three-fourths rather broad and with central portion slightly expanded dorsad and ventrad, apex broadly and evenly rounded.

Transtilla with arm glabrous, well sclerotized, slightly more than one-fifth as long as harpe, basal portion considerably expanded (especially dorsad), apical portion curving ventrad to costa, terminating subacutely at basal extremity of harpe.

Uncus single. Dorsal aspect: rather large, subtriangular; base with cephalic margin indistinctly fusing with tegumen, large mesal area rather weakly sclerotized and glabrous; lateral margins of base heavily sclerotized, set off from tegumen by areas of reduced sclerotization, sparsely punctate and setose, sublinear, gradually converging distad into uncal process; uncal process rather robust, well sclerotized, concave beneath, curving considerably ventrad, apex subacute.

Gnathos fused, large and broad, considerably flattened dorsoventrad, curving ventrocaudad, mesobasal portion rather weakly sclerotized, apical portion becoming fairly well sclerotized and scobinate distad, lateral margins well sclerotized, apex very broadly and evenly rounded.

Anellus large, membranous, armed mesocaudad with juxta. Juxta large but rather weakly sclerotized, consisting of subsymmetrical pouch opening at cephalic and caudal extremities, surrounding and serving as guide for aedeagus, approximately one-third as long as aedeagus, base truncate, lateral margins diverging distad, apical extremity almost twice as broad as basal extremity, ventral portion of apical margin broadly emarginate, ental surface striate (especially in dorsal and apical portions), ectal surface rather densely covered with extremely small seta-like processes.

Aedeagus considerably reduced, slightly more than half as long as harpe, asymmetrical, sublinear in all aspects; base somewhat expanded, emarginate ventrad, opening dorsad; approximate basal half cylindrical; central portion with dextral margin somewhat expanded and produced into one large and several minute, acute, well sclerotized, spinelike processes directed distad; approximate apical half broadly opening dorsad and consisting of broad ventral strip irregularly narrowing distad and terminating in narrowly rounded apex.

Vesica medium sized, membranous, unarmed.

TYPE.—Holotype ♂ (type no. 61445) in the U.S. National Museum.

PARATYPES (2 ♂♂).—Illinois State Natural History Survey (1 ♂); U.S. National Museum (1 ♂).

TYPE LOCALITY.—Pecos, San Miguel Co., N. Mex. (July 17, T. D. A. Cockerell).

DISTRIBUTION.—Western United States. New Mexico and Utah.

SPECIMENS EXAMINED.—3 (all ♂♂), from 2 localities:

NEW MEXICO: Pecos, San Miguel Co., 2 ♂♂ (July 17, T. D. A. Cockerell). UTAH: Salt Lake City, Salt Lake Co., ♂ (no date, Andreas Bolter collection).

REMARKS.—This moth is quite rare in collections. It is not closely related to any of the other acrolophids known to occur in America north of Mexico. *A. juxtatus* is generally related to those species having shortened labial palpi. Specifically, it may be characterized by its

combination of rather short labial palpi, naked eyes, strongly bipectinate antennae, simple uncus, and fused gnathos. In addition, the genital characters of *juxtatus* are also quite distinct from those of all the other species treated here. Its uncal process and harpe are characteristically shaped, its aedeagus is markedly asymmetrical and distinctive, and its anellus is armed with a prominent juxta.

The name, *juxtatus*, is derived from the Latin word, *juxta*, meaning "near to, nigh," and the suffix, *-atus*, meaning "provided with." In the terminology of the Lepidoptera, the adverb, *juxta*, has been taken from the Latin and directly applied as the name of a male genital structure. It is used here in this sense, referring to the presence of a distinct and characteristic juxta in this species.

36. *Acrolophus chiricahuae*, new species

FIGURES 172-174

Female unknown.

MALE.—Somewhat resembling *dorsimaculus* in general habitus. Head, labial palpi, and thorax ochreous suffused with fuscous. Labial palpi intermediate in length, recurved back over head and extending across anterior third of thorax, closely appressed to head and to each other, strongly diverging from thorax distad, clothed with slender scales. Eyes large, protruding, naked, moderately lashed. Antennae strongly bipectinate, ochreous, covered dorsad by scales; segmental processes rather robust but well separated from one another in lateral aspect, free of scales but finely ciliated. Forewings with color pattern quite variable, ground color and markings various shades of brown; costal margin with alternate dark and light bars, apical and posterior margins with broad ochreous patches, apical third with irregular brownish marking between outer end of cell and apex, basal two thirds deep brown above fold. Hindwings and fringes pale brown. Abdomen brown, tinged with fuscous beneath. Wing expanse: 26 to 28 mm.

MALE GENITALIA.—Vinculum typical, as in other species, well sclerotized.

Tegumen glabrous; lateral arm broadest in central portion, narrowing toward extremities, margins sinuate; dorsal area narrow.

Harpe simple. Lateral aspect: rather elongate and slender, sinuate, with approximate apical quarter curving considerably ventrad; costa and sacculus fused, comprising basal half of harpe, glabrous except for punctate and setose ventrocaudal portion of sacculus, broadest in apical third, gradually narrowing basad to subacute basal extremity; cucullus indistinctly separated from costa and sacculus by ental area of reduced sclerotization, comprising approximate apical half of harpe; very heavily punctate and setose ectad and entad ex-

cept for small, glabrous, dorsobasal area; basal half slender, with margins subparallel, curving somewhat dorsad; apical half moderately expanding distad, curving considerably ventrad; apex broad, truncate, with dorsal extremity rounded, ventral extremity angulate.

Transtilla with arm very short, approximately one-seventh as long as harpe, broad, well sclerotized, glabrous, rather closely subparallel with dorsal margin of costa, terminating acutely considerably distad of basal extremity of harpe.

Uncus simple. Dorsal aspect: base small, concave beneath, set off from tegumen by areas of reduced sclerotization; glabrous except for small, finely punctate and setose, caudolateral areas; lateral margins well sclerotized, strongly converging distad into base of uncal process; uncal process elongate, rather robust, curving caudoventrad, well sclerotized, with faint trace of median longitudinal suture, major portion glabrous, apical third finely punctate and setose ventrad, narrowing only slightly to subacute apex.

Gnathos fused, large, flattened dorsoventrad, directed caudoventrad, large mesobasal portion membranous to weakly sclerotized, apical portion finely but densely scobinate entad, lateral margins heavily sclerotized and converging distad into smoothly and evenly rounded apex.

Anellus large, membranous, unarmed but with portion encircling aedeagus weakly sclerotized and suggesting trace of juxta.

Aedeagus approximately two-thirds as long as harpe, slender, cylindrical, asymmetrical, sublinear in dorsal and ventral aspects, basal extremity and approximate apical third curving considerably ventrad in lateral aspect, base weakly expanded laterad and emarginate mesad, rather small apical portion opening dorsad; apex irregularly rounded and with dextral margin produced distad into small, well sclerotized, acute, spinelike process.

Vesica small, membranous, unarmed.

TYPE.—Holotype ♂ (type no. 61446) in the U.S. National Museum.

PARATYPES (3 ♂♂).—U.S. National Museum (3 ♂♂).

TYPE LOCALITY.—Chiricahua Mountains, Cochise Co., Ariz. (Aug. 16–23, collector unknown).

DISTRIBUTION.—Southwestern United States. Southern Arizona.

SPECIMENS EXAMINED: 4 (all ♂♂), from 2 localities:

ARIZONA: Chiricahua Mountains, Cochise Co., ♂ (June 16–23, collector unknown), ♂ (Aug. 16–23, collector unknown), ♂ (date and collector unknown, labeled "*Felderia dorsimacula* Dyar" in Dyar's handwriting); locality and date unknown, ♂ ("So. Arizona," O. C. Poling).

REMARKS.—This species undoubtedly ranges southward into Mexico. It appears to be quite rare in collections. Although *A. chiricahuae* is not closely related to any of the other acrolophids known to occur in America north of Mexico, its strongly bipectinate antennae, naked

eyes, simple uncus, and fused gnathos are quite similar to those of *juxtatus*. However, the labial palpi of *chiricahuae* are intermediate in length and noticeably extend onto the anterior margin of the thorax, whereas those of *juxtatus* are rather short and barely extend onto the thorax. Further, the genital differences between these two species are quite marked. Their unci, harpes, and aedeagi are respectively distinct. Lastly, the anellus of *chiricahuae* is unarmed or bears only a faint trace of a juxta. In general, the genitalia of *chiricahuae* seem more similar to, but still distinct from, those of *minor*.

37. *Acrolophus fervidus* Busck

FIGURES 175–176

Acrolophus fervidus Busck, 1913, Proc. Ent. Soc. Washington, vol. 14, no. 4, pp. 222–223, Jan. (originally described from Mexico. New to United States check lists).—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, p. 385.—Kaye, 1925, Trans. Ent. Soc. London, 1924–1925, p. 428, pl. 45, fig. 2.

Neolophus antonellus Barnes & McDunnough, 1913, Can. Ent., vol. 45, no. 12, p. 419, pl. 16, fig. 3, Dec. (fig. 4 is incorrectly labeled *Eulepiste antonellus*. *Neolophus antonellus* is shown only at fig. 3). (New synonymy.)

Acrolophus antonellus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8159.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9545.

Busck's original description follows:

Acrolophus fervidus—Labial palpi erect, reaching just beyond vertex, loosely haired, light ochreous with dark brown base. Antennae short, stout, light ochreous. Head and thorax reddish ochreous; patagina light ochreous with a reddish brown longitudinal stripe. Forewings whitish ochreous, heavily overlaid with bright reddish-brown scales, especially on basal two-thirds; on the middle of the wing from base to lower corner of the cell is a broad unmottled whitish streak, edged above and below with dark brown; above this is a black longitudinal line from the middle to the end of the cell terminating in a small black spot; veins 2 to 5 are indistinctly traced by dark brown lines; cilia with alternate whitish ochreous and reddish-brown tufts. Hind wings of a rich dark brown color with light ochreous cilia. Abdomen blackish brown above; dusky ochreous below; anal tuft ochreous. Legs clothed with mixed ochreous reddish and black hairs. Alar expanse, 28 to 32 mm.

Habitat: Orizaba, Mexico, R. Müller, collector. June.

Type: No. 15419, U.S. National Museum.

In the National Museum is also a large series of this species from Sixola River and Turialba, Costa Rica, William Schaus, collector.

MALE GENITALIA.—Vinculum large, heavily sclerotized, otherwise typical.

Tegumen glabrous; lateral arm elongate, slender, gradually narrowing to point of articulation with vinculum, margins moderately sinuate, dorsal margin rather weakly sclerotized, ventral margin heavily sclerotized; dorsal area rather broad, with caudal margin

evenly expanded to occupy large mesal emargination in base of uncus. Harpe simple. Lateral aspect: broad, robust; costa and sacculus fused, comprising slightly more than basal half of harpe, glabrous except for punctate and setose ventrocaudal margin of sacculus, broadest in apical third at point of attachment of arm of transtilla, approximate basal two-thirds gradually and evenly narrowing basad to narrowly rounded basal extremity, dorsal and ventral margins sublinear; cucullus partially and indistinctly separated from costa and sacculus by irregular areas of reduced sclerotization, ectal surface glabrous, ental surface sparsely and finely punctate and setose, dorsal margin heavily sclerotized and weakly sinuate, ventral margin moderately sclerotized and sublinear, moderately expanded at base, considerably narrowed dorsad and ventrad somewhat distad of base, approximate apical two-thirds expanding considerably ventrad and markedly dorsad to form unusually broad apex; apex evenly emarginate near ventral extremity, with dorsal and ventral extremities rounded.

Transtilla with arm short, approximately one-sixth as long as harpe, well sclerotized, glabrous, weakly sinuate, strongly diverging from dorsal margin of costa, terminating acutely far distad of basal extremity of harpe.

Uncus obscurely bifid, similar to that of *persimplex*. Dorsal aspect: base largely separated from tegumen by areas of reduced sclerotization, cephalic margin with broad and deep mesal emargination entirely occupied by large caudal expansion of tegumen, mesal area moderately sclerotized and glabrous; lateral margins very heavily sclerotized, sparsely punctate and setose distad, sublinear, gradually converging distad into bases of furcae; angle of bifurcation extremely small, acute, located near midpoint of main uncal process; furcae approximate, appearing almost as single process in dried specimens, of medium length and width, heavily sclerotized, directed caudad and curving slightly ventrad, lateral margins sparsely and finely punctate and setose, apices acute.

Gnathos fused, similar to that of *persimplex*, large and broad, curving ventrocaudad, large mesobasal portion membranous to weakly sclerotized, lateral margins and apical portion well sclerotized; approximate apical third considerably thickened dorsoventrad, heavily scobinate dorsad, densely clothed ventrad with minute seta-like processes; lateral margins evenly converging distad into broadly rounded apex; apex very weakly emarginate.

Anellus large, membranous, unarmed, juxta absent.

Aedeagus slender, rather elongate, slightly longer than harpe, glabrous, cylindrical, asymmetrical, sublinear in lateral aspect, basal and apical portions curving somewhat sinistrad in dorsal and ventral aspects, approximate basal fifth moderately expanded laterad and

opening broadly dorsad, basal extremity weakly and irregularly emarginate ventrad, approximate apical seventh moderately expanded dorsoventrad and irregularly opening dextrad; apex produced into prominent, heavily sclerotized, acute, sinuate, recurved, sinistral, spinelike process approximately one-fourth as long as aedeagus.

Vesica small, membranous; densely clothed with extremely small, slender, finely acute, needlelike processes or spicules.

TYPE.—Type ♂ (type no. 15419) in the U.S. National Museum.

TYPE LOCALITY.—Orizaba, Mexico.

DISTRIBUTION.—Central America and Mexico northward into southwestern United States. Texas.

SOURCE OF MATERIAL.—U.S. National Museum (2 ♂♂).

SPECIMENS EXAMINED.—2 (both ♂♂), from 2 localities:

COSTA RICA: Sixola River, ♂ (no date, William Schaus collection). This specimen is from the type series representing *fervidus*. It is labeled "*Acrolophus fervidus* Busck, cotype, U.S.N.M. type no. 15419." TEXAS: San Antonio, Bexar Co., ♂ (no date, William Barnes collection). This specimen is the holotype of *antonellus* (Barnes & McDunnough), treated below as a synonym of *fervidus*.

REMARKS.—This species is recorded here from the United States for the first time. It is closely related to *persimplex* and the complex species, *sinclairi*, forming with them a rather distinct species group. Briefly, this group may be characterized as having shortened labial palpi, antennae in which each segment is clothed only dorsad or dorsolaterad with scales, obscurely bifid uncus, fused gnathos, and a type of harpe in which the cucullus is very broadly expanded. The members of the *persimplex-fervidus-sinclairi* species group may be distinguished from one another on the basis of antennal and genital characters.

A. fervidus may be distinguished from its close relatives by its rather unusual color pattern, the shape of its cucullus, and its characteristic aedeagus. The apex of the latter organ is produced into a prominent, recurved process in this species. The antennal structure of *fervidus* represents a transition between the laminate and unipectinate types. Within the species group in question, *fervidus* is most closely related to *persimplex* on the basis of antennal and genital structure. However, the harpe and aedeagus of *fervidus* are quite distinct from those of *persimplex* as well as from those of all the other species of *Acrolophus* known to occur in America north of Mexico.

I have examined the type ♂ specimen at the U.S. National Museum. It is labeled "*Acrolophus fervidus* Busck, type no. 15419, Orizaba, Mexico, May 1908." Dr. Clarke removed the genitalia of the type for me and the identity of this species was further confirmed. It is apparently quite common in Central America.

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Walsingham (1915) further reported *fervidus* from Panama and Colombia, South America. In addition, information on file at the U.S. National Museum shows that this species has been reared from the roots of orchids from Colombia, South America. Kaye (1925) published a color reproduction (half specimen) of the adult of this insect.

Barnes and McDunnough described *Neolophus antonellus* as a new species in 1913. The description was based on a single ♂ specimen collected at San Antonio, Tex. The type, then deposited in the Barnes collection, was listed as having a wing expanse of 33 mm. The figure cited is a photograph showing the pinned and spread moth in dorsal aspect. The species name was apparently taken from the type locality, San Antonio. Since 1913, *antonellus* has appeared in the literature as a distinct species.

The type ♂, in the U.S. National Museum and labeled "*Neolophus antonellus* B. & McD., type no. 61453, San Antonio, Texas," appears similar to the type ♂ of *A. fervidus*. Dr. Clarke removed the genitalia of both types and they were identical. The moths themselves also proved to be the same in all respects.

Thus, *antonellus* (Barnes & McDunnough) should be considered a new synonym of the slightly older Mexican species, *fervidus* Busck. The type of *antonellus* is the only specimen of *fervidus* that has been recorded from the United States, so far as I know.

38. *Acrolophus persimplex* (Dyar)

FIGURES 177-180

Neolophus persimplex Dyar, 1900, Can. Ent., vol. 32, no. 11, p. 327, Nov.; 1903, List North Amer. Lep., p. 577, no. 6578.

Acrolophus (*Neolophus*) *persimplex* Busck, 1912, Proc. Ent. Soc. Washington, vol. 14, no. 3, p. 184.

Acrolophus persimplex Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8155.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9541.

Dyar's original description follows:

Neolophus persimplex—Palpi short, erect, reaching to vertex of head, and closely appressed, densely hairy, slightly tufted on the joints, the third joint smoother. Body robust, in size and appearance resembling *Pseudanaphora davisellus*, Beut., but veins 8 and 9 of fore wings stalked. Antennae subserrate, especially towards tips. Head and thorax dark gray. Fore wing pale cinerous gray, mottled with black, heaviest in the centre of the wing, the dark area forming a quadrate or pointed patch on the centre of the inner margin, and a diffuse discal patch, becoming merged in the mottlings along costal edge of wing; area along inner margin lighter gray. Hind wings dark gray. Expanse 22 to 24 mm. Male genitalia with the uncus a single long spine tapering from a broad base, obliquely bent downward; harpes broad, concave, strongly widened at tips, rounded with a slight projection on the terminal margin.

Nine examples; Huachuca Mts., Arizona; July 16 to Aug. 23 (Dr. W. Barnes); U.S. Nat. Mus., type No. 5343.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen glabrous, width medium; lateral arm narrowing gradually to point of articulation with vinculum, cephalic margin weakly sinuate, caudal margin sublinear and well sclerotized; dorsal area with cephalic margin sinuate and broadly emarginate mesad, caudal margin irregular and partially fusing with base of uncus.

Harpe simple but with distinct clasper arising from inner surface of cucullus, very broad and robust. Lateral aspect: costa and sacculus fused, comprising approximate basal four-sevenths of harpe, glabrous except for rather large ventrocaudal area of sacculus clothed with elongate setae, broadest at point of attachment of arm of transtilla, approximate basal three-fourths narrowing to very narrow basal extremity, apical portion abruptly narrowed dorsad at point of fusion with base of cucullus. Cucullus indistinctly fused with costa and sacculus, very sparsely punctate and setose, base broad, dorsal and ventral margins heavily sclerotized, dorsal margin markedly sinuate, ventral margin evenly expanding ventrad toward apex; apex very broad, irregularly and bluntly rounded; well sclerotized ental area arising from ventral margin of central third of cucullus curving dorsocephalad and terminating near dorsobasal extremity of cucullus in heavily sclerotized, acute clasper curving toward meson of genital capsule.

Transtilla with arm glabrous, well sclerotized, considerably reduced, only one-sixth to one-seventh as long as harpe, broadly separated from margin of costa, terminating acutely far caudad of basal extremity of harpe.

Uncus obscurely bifid. Dorsal aspect: base largely separated from tegumen by areas of reduced sclerotization, cephalic margin with broad and deep mesal emargination mostly occupied by large caudal expansion of tegumen, mesal area rather weakly sclerotized and glabrous; lateral margins of base heavily sclerotized, sparsely punctate and setose, weakly sinuate, converging caudad into bases of furcae; angle of bifurcation extremely small, acute, located near midpoint of main uncal process; furcae approximate, appearing almost as single process in dried specimens, length medium, rather narrow, heavily sclerotized, directed caudad and slightly ventrad, lateral margins sparsely punctate, apices acute and slightly divergent.

Gnathos fused, large and broad, curving ventrocaudad, mesal portion of basal half weakly sclerotized; approximate apical half fairly well sclerotized, considerably thickened dorsoventrad, heavily scobinate dorsad, densely clothed ventrad with minute seta-like

processes; lateral margins heavily sclerotized, sublinear, converging distad to broadly and evenly rounded apex.

Anellus large, membranous, unarmed, juxta absent.

Aedeagus rather slender, length medium, approximately five-sixths as long as harpe, glabrous, cylindrical, asymmetrical, linear in dorsal and ventral aspects, sinuate in lateral aspect with basal portion curving somewhat dorsad and apical portion curving somewhat ventrad; approximate basal fourth slightly expanded, opening broadly dorsad, very weakly emarginate ventrad; remainder of aedeagus gradually and evenly narrowing distad; approximate apical three-tenths opening broadly sinistrad and consisting simply of well sclerotized dextral strip produced near apex into small, heavily sclerotized, acute, spinelike process directed dextrad.

Vesica medium sized, membranous, unarmed.

TYPE.—Type ♂ (type no. 5343) in the U.S. National Museum.

TYPE LOCALITY.—Huachuca Mountains, Ariz.

DISTRIBUTION.—Southwestern United States. Arizona.

SOURCES OF MATERIAL.—California Academy of Sciences (7 ♂♂); Carnegie Museum (2 ♂♂).

SPECIMENS EXAMINED.—9 (all ♂♂), from 2 localities:

ARIZONA: Huachuca Mountains, 2 ♂♂ (Carr Canyon, Aug. 5, 1924, J. O. Martin), 5 ♂♂ (Carr Canyon, Aug. 7, 1924, E. P. Van Duzee); Palmerlee, Cochise Co., ♂ (date and collector unknown); locality and date unknown, ♂ ("Arizona," Engel collection).

REMARKS.—This species undoubtedly ranges southward into Mexico. It is closely related to *fervidus* and the complex species, *sinclairi*, forming with them a rather distinct species group. This group, consisting of fairly large and robust moths, has been characterized in the foregoing remarks on *fervidus*. *A. persimplex* may be distinguished from its close relatives, as well as from the other members of the genus, by its color pattern, the shape of its aedeagus, and by the presence of a distinct clasper on the inner surface of the cucullus of its harpe. The antennae of *persimplex* are quite similar to the peculiar type exhibited by *fervidus*, and they are perhaps best described as representing a transitional form between reduced lamination and reduced unipectination. The genital structure of *persimplex* is consistent throughout my specimens representing this species.

I have examined the type ♂ specimen at the U.S. National Museum. It is labeled "*Neolophus persimplex* Dyar, type no. 5343, Huachuca Mts., Ariz., Aug. 8–15." Dr. Clarke removed the genitalia of the type for me and the identity of this species was further confirmed. In the antennae of the type specimen, each segmental process exhibits the characteristic, minute, spinelike structure at its apex. My examination of a slide preparation of ♂ genitalia labeled "*Acrolophus*

persimplex Dyar, Cotype, Huachuca Mts., Ariz., Aug. 8–15" gave additional confirmation to the identity of this species.

39. *Acrolophus sinclairi*, new species

This complex species is composed of the two new subspecies described below.

39a. *Acrolophus sinclairi sinclairi*, new subspecies

FIGURES 181–183

MALE.—Head, labial palpi, and thorax ochreous tinged with white and fuscous. Labial palpi short, partially recurved but not extending to antennal bases, rather narrowly separated from each other, closely appressed to head except at apices, densely clothed with slender scales. Eyes large, protruding, naked, weakly lashed. Antennae unipectinate, ochreous, covered dorsolaterad with scales; segmental processes (fig. 181) subcircular in transverse section, developed ventrad rather than laterad, somewhat thickened but well separated from one another in lateral aspect, free of scales but covered with elongate setae. Forewings with variable color pattern, ground color pale brown, finely sprinkled with fuscous, marked with dark brown; markings consisting of faint spots along costa, narrow bar at outer end of cell, and irregular patch extending from fold to center of posterior margin. Hindwings pale brown, fringes brownish-white. Abdomen pale brown, covered with broad scales rather densely overlaid with very slender scales or hair. Wing expanse: 24 to 30 mm.

FEMALE.—Coloration similar to that of ♂, pattern variable as in ♂. Labial palpi slightly shorter than those of ♂, directed upward and forward, narrowly separated from each other, basal halves closely appressed to head, densely clothed with both broad and slender scales. Eyes essentially same as those of ♂. Antennae similar to those of ♂ but with segmental processes considerably smaller. Forewings brown, heavily sprinkled with fuscous. Hindwings, fringes, and abdomen colored as in ♂. Wing expanse: 26 to 29 mm.

MALE GENITALIA.—Vinculum in form of rather narrow, heavily sclerotized, lateroventral band.

Tegumen glabrous; lateral arm rather broad but gradually narrowing to point of articulation with vinculum, cephalic margin sinuate, caudal margin sublinear and well sclerotized; dorsal area very broad, cephalic margin sinuate and with broad but shallow mesal emargination, caudal margin fusing mesad with base of uncus.

Harpe simple, broad. Lateral aspect: costa and sacculus fused, comprising somewhat more than basal half of harpe, glabrous except for large punctate and setose ventrocaudal area of sacculus, broadest at point of attachment of arm of transtilla, approximate basal half

irregularly narrowing to narrow basal extremity, apical portion abruptly narrowed dorsad at point of fusion with base of cucullus. Cucullus only partially set off from costa and sacculus by areas of reduced sclerotization, sparsely punctate and setose about margins (especially entad), base broad, dorsal margin sublinear, approximate apical half slightly to markedly expanded ventrad; apex very broad, broadly and evenly rounded dorsad, bluntly to narrowly rounded ventrad.

Transtilla with arm glabrous, well sclerotized, short, approximately one-fifth as long as harpe, basal two-thirds diverging from and apical third converging toward margin of costa, terminating subacutely considerably caudad of basal extremity of harpe.

Uncus obscurely bifid, subtriangular, similar to that of *griseus*. Dorsal aspect: base large, glabrous, mesal portion of cephalic margin fusing with tegumen; lateral margins of base set off from tegumen by irregular areas of reduced sclerotization, heavily sclerotized, sparsely punctate and setose, converging caudad into furcae; angle of bifurcation entirely obscured; furcae approximate, appearing as single process with median longitudinal suture (especially in dried or untreated specimens), elongate, narrow, heavily sclerotized, directed caudad and slightly ventrad, lateral margins sparsely punctate and setose, apices acute.

Gnathos fused, large and broad, curving ventrocaudad, mesal portion of basal half very weakly sclerotized; approximate apical half fairly well sclerotized, considerably thickened dorsoventrad, heavily scobinate dorsad, densely clothed ventrad with minute seta-like processes; lateral margins heavily sclerotized, converging distad to very broadly and evenly rounded apex.

Anellus large, membranous, unarmed, juxta absent.

Aedeagus rather slender, length medium, approximately six-sevenths as long as harpe, cylindrical, asymmetrical, glabrous, sinuate in dorsal and ventral aspects, approximate apical fourth curving somewhat ventrad in lateral aspect; base slightly expanded laterad, emarginate ventrad, opening dorsad; central portion somewhat narrowed, gradually expanding again toward apex; approximate apical third opening broadly and irregularly and consisting simply of sclerotized, dextral strip terminating distad in small, well sclerotized, acute, spinelike process directed sinistrad.

Vesica fairly large, membranous, unarmed.

TYPE.—Holotype ♂ and allotype ♀ (type no. 61447) in the U.S. National Museum.

PARATYPES (13 ♂♂, 2 ♀♀).—California Academy of Sciences (5 ♂♂, 1 ♀); Denison University (1 ♂); U.S. National Museum (7 ♂♂, 1 ♀).

TYPE LOCALITY.—Mohave Co., Ariz. (June, collector unknown).

DISTRIBUTION.—Southwestern United States. Arizona, New Mexico, and Texas.

SPECIMENS EXAMINED.—17 (14 ♂♂, 3 ♀♀), from 4 localities:

ARIZONA: Boulder Springs, Mohave Co., ♂ (July 1–15, 1921, O. C. Duffner); Mohave Co., 7 ♂♂, ♀ (June 8–15, one ♂ with mites, collector unknown), ♀ (June 16–23, collector unknown), ♂ (July 8–14, collector unknown). NEW MEXICO: Carlsbad Cavern, Eddy Co., 4 ♂♂ (May 16, 1927, J. O. Martin), ♀ (May 17, 1927, Martin). TEXAS: Alpine, Brewster Co., ♂ (May 5, 1927, J. O. Martin).

REMARKS.—This subspecies should also be found in the southern portions of Utah, Nevada, and California. In addition, it undoubtedly ranges southward into Mexico.

The complex species, *sinclairi*, is closely related to *persimplex* and *fervidus*, forming with them a rather distinct species group. This group has already been characterized in the foregoing remarks on *fervidus*. *A. sinclairi* may be distinguished from its close relatives, as well as from the other members of the genus, on the basis of its antennal and genital structure. The antennae may be either unipectinate or reduced bipectinate.

The subspecies, *sinclairi sinclairi*, may be separated from its companion subspecies, *sinclairi nelsoni*, on the basis of antennal structure. The former exhibits unipectinate antennae and the latter has antennae of a reduced bipectinate type, both conditions being described in detail in couplet 48 of the key (p. 519). The two subspecies have different geographical distributions. They can not be satisfactorily distinguished from each other by genital differences. The genitalia of *sinclairi sinclairi* exhibit affinities with those of the complex species, *griseus*, although their respective aedeagi are quite distinct and the two are generally dissimilar in regard to other structures. The cucullus of the harpe in *sinclairi sinclairi* is somewhat variable. In the specimens from Arizona, the ventral portion of the apex of this structure is quite markedly expanded ventrad, whereas the specimens from New Mexico and Texas exhibit a correspondingly less pronounced expansion. This subspecies is named for the George M. Sinclair family of Urbana, Ill.

39b. *Acrolophus sinclairi nelsoni*, new subspecies

FIGURES 184–185

MALE.—Coloration and structure, except for antennae, essentially same as in *sinclairi sinclairi*. Head, labial palpi, and thorax ochreous tinged with white. Labial palpi short, partially recurved but not extending to antennal bases, narrowly separated from each other, closely appressed to head except at apices, densely clothed with slender scales. Eyes rather small, weakly protruding, naked, moderately lashed. An-

tennae reduced bipectinate, ochreous, covered dorsad with scales; each segmental process (fig. 185) somewhat emarginate mesad in transverse section, developed strongly laterad into pair of secondary processes narrowly rounded at apices, quite slender in lateral aspect, free of scales but covered with elongate setae. Forewings with color pattern somewhat variable, ground color pale brown, marked with dark brown or fuscous; markings consisting of short bars along costa, distinct spot at outer end of cell, and suffused patch extending from fold to center of posterior margin. Hindwings brown, fringes brownish white. Abdomen pale brown, covered with broad scales very densely overlaid with elongate hairs. Wing expanse: 25 to 26 mm.

Male genitalia.—The foregoing description of the genitalia of *sinclairi sinclairi* will largely suffice for those of *sinclairi nelsoni*. In the latter subspecies, the vinculum is broader and more like the typical form exhibited by the majority of acrolophids, the harpe and the arm of the transtilla (fig. 184) present a somewhat different shape in lateral aspect, and a minute angle of bifurcation may be observed in the apical fourth or fifth of the main uncal process. The other genital structures of *sinclairi sinclairi* and *sinclairi nelsoni* exhibit only minor differences between these two subspecies.

Female.—Coloration similar to that of ♂. Labial palpi as in ♂ except somewhat shorter. Eyes essentially same as those of ♂, rather weakly lashed. Antennae missing (broken off just above bases). Wing expanse: 28 mm.

Type.—Holotype ♂ and allotype ♀ in the Illinois State Natural History Survey.

Paratypes (3 ♂♂).—Illinois State Natural History Survey (2 ♂♂); United States National Museum (1 ♂).

Type locality.—Las Vegas, San Miguel Co., N. Mex. (no date, Andreas Bolter collection).

Distribution.—Southwestern United States. New Mexico.

Specimens examined.—5 (4 ♂♂, 1 ♀), from one locality:

New Mexico: Las Vegas, San Miguel Co., 4 ♂♂, ♀ (no date, two ♂♂ without abdomens, Andreas Bolter collection).

Remarks.—This subspecies is quite rare in collections. With its companion subspecies, *sinclairi sinclairi*, it forms the complex species, *sinclairi*. The latter is closely related to *persimplex* and *fervidus*, forming with them a species group. This group has been characterized in the foregoing remarks on *fervidus*.

A. sinclairi nelsoni may be separated from *sinclairi sinclairi*, as has been described in the foregoing remarks on the latter subspecies, chiefly on the basis of differences in antennal structure. In each of these two subspecies, the characteristic type of antenna is consistently exhibited by my series of specimens. Both subspecies present about

the same appearance in size and general habitus, with both exhibiting short labial palpi and naked eyes. In addition, their great similarity in regard to genital structure indicates that they are very closely related.

On the basis of the material at hand, *sinclairi sinclairi* and *sinclairi nelsoni* should be considered distinct. However, in the event that transitional forms are found to occur between the two, and this is not entirely unlikely, the resulting single species would certainly exhibit an unusual amount of variation or instability in regard to antennal structure. This subspecies is named for the Ralph W. Nelson family of Chicago.

40. *Acrolophus quadrellus* (Barnes & McDunnough)

FIGURES 186–189

Pseudanaphora quadrellus Barnes & McDunnough, 1913, Can. Ent., vol. 45, no. 12, pp. 420–421, pl. 16, figs. 1, 2, Dec. (fig.1, type ♂; fig. 2, type ♀).
Acrolophus quadrellus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8194.—Barnes & Lindsey, 1921, Contrib. Nat. Hist. Lep. North Amer., vol. 4, no. 4, pl. 40, fig. 7.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 104, no. 9584.

Barnes and McDunnough's original description follows:

Pseudanaphora quadrellus—♂.—Antennae very slightly serrate below, palpi upturned, roughly haired, brown; thorax chocolate-brown; primaries chocolate brown shaded with pale ochreous especially along inner margin and termen; costa with alternate striae of chocolate-brown and ochreous; slight ochreous tinge in cell; dark discocellular dash; inner margin broadly ochreous, more or less striate with brown, upper edge of this ochreous stripe irregular with prominent blunt tooth of ground-colour projecting downward towards middle of inner margin; before and after this tooth the margin is rounded, bent sharply upwards beyond origin of vein 3 as far as vein 7, bending again at right angles and attaining termen below apex, forming a large subquadrate terminal ochreous patch; faint terminal row of dark dots; fringes checkered brown and ochreous with pale basal line. Secondaries pale smoky brown with ochreous terminal line and checkered fringes. Beneath smoky brown, costa of primaries apically ochreous with 3 or 4 brown striae, narrow terminal ochreous line, secondaries and fringes as above.

♀.—Palpi short, hairy, porrect; primaries more uniform chocolate brown with only faint traces of ochreous along inner margin; a paling of the ground colour represents the quadrate terminal patch so prominent in the ♂. Expanse ♂ 25 mm. ♀ 28 mm.

Habitat: Palmerlee, Ariz. 7 ♂, 3 ♀. Types, Coll. Barnes.

The species is allied to *davisellus* Beut., but should be readily distinguished by the dark apex and subquadrate ochreous terminal patch with sharply defined inner edge. The males vary in the amount of brown striations on the ochreous area; in some there are scarcely any, in others they show a tendency to obscure this area more or less completely.

MALE GENITALIA.—Vinculum typical, as in other species, well sclerotized.

Tegumen glabrous; lateral arm somewhat expanded below midpoint, narrowing toward basal and apical extremities; dorsal area rather narrow, undivided, with caudolateral extremities produced into pair of rounded projections at points of fusion with base of gnathos.

Harpe simple, linear. Lateral aspect: costa and sacculus typical, fused, broadest in apical portion, narrowing toward rounded base, glabrous except for sparsely setose ventral margin of sacculus. Cucullus well set off from costa and sacculus by ventral emargination, small dorsal expansion, and area of reduced sclerotization; comprising slightly more than apical half of harpe, rather elongate and slender, heavily sclerotized, heavily punctate and setose ectad and entad, dorsal margin smooth and sublinear, ventral margin markedly and irregularly dentate, apex narrowly rounded.

Transtilla with arm of medium length, rather broad, glabrous, weakly sinuate, extending to or slightly beyond basal extremity of harpe, apex weakly and irregularly expanded.

Uncus simple, except at extreme apex. Dorsal aspect: base rather weakly sclerotized, sparsely punctate and setose, cephalic margin emarginate mesad, lateral margins linear and converging distad into uncal process; uncal process indistinctly fused with base, heavily sclerotized, concave beneath, gradually narrowing distad, apical two-thirds curving considerably ventrad, apex minutely and acutely bifid.

Gnathos paired, very distinctive, glabrous; lateral margins heavily sclerotized, angle of bifurcation broadly and evenly rounded; arms elongate, broad, with apical halves narrowing distad, very heavily sclerotized and darkened, gradually diverging distad, directed ventrocaudad, apices acute.

Anellus membranous, unarmed, juxta absent.

Aedeagus rather short, slender, asymmetrical, glabrous. Lateral aspect: portion somewhat basad of center curving through angle of approximately 90° resulting in apical three-fifths of aedeagus extending almost directly ventrad, base broadly and irregularly expanded laterad and ventrad, basal half cylindrical and narrowing ventrad toward apex; major portion of apical half opening dorsad and consisting of rather narrow, well sclerotized, ventral strip with subacute apex.

Vesica elongate, slender, membranous, unarmed.

TYPE.—Holotype ♀ and ♂ and ♀ "cotypes" (type no. 61454) in the U.S. National Museum.

TYPE LOCALITY.—Palmerlee, Cochise Co., Ariz.

DISTRIBUTION.—Southwestern United States. Arizona.

SOURCES OF MATERIAL.—American Museum of Natural History

(12 ♂♂); Carnegie Museum (2 ♂♂); Ohio State University (1 ♂); University of Kansas (1 ♂).

SPECIMENS EXAMINED.—16 (all ♂♂), from 3 localities:

ARIZONA: Huachuca Mountains, ♂ (Aug. 1, 1927, mite on forewing, P. A. Readio), ♂ (July 20, 1937, with 5 mites, D. J. and J. N. Knull); Huachuca Mountains, Cochise Co., 5 ♂♂ (Ramsay Canyon, July 10–15, 1941, A. B. Klots), 7 ♂♂ (Ramsay Canyon, July 16, 1948, C. and P. Vaurie); Palmerlee, Cochise Co., ♂ (date and collector unknown); locality and date unknown, ♂ ("Arizona," Engel collection).

REMARKS.—This species undoubtedly ranges southward into Mexico. It is not closely related to any of the acrolophids known to occur in America north of Mexico. *Acrolophus quadrellus* is generally related to those species having shortened labial palpi and antennae in which each segment is clothed only dorsad or dorsolaterad with scales. Specifically, it may be easily distinguished from all other species treated here by three of its genital structures. These structures are not only distinctive but also clearly observable in undissected specimens. The apex of its uncal process is acutely bifid; the cucullus of its harpe is densely setose and prominently dentate along the ventral margin; and, its gnathos is characteristically paired by a very broadly and evenly rounded angle of bifurcation. The arms of the gnathos are divergent and elongate, with their apical halves narrowing and becoming very heavily sclerotized distad. This type of gnathos is both atypical and unique among the species under consideration. The genital structure of this fairly large acrolophid is quite consistent throughout my series of specimens.

I have examined the type ♀ specimen at the U.S. National Museum. It is labeled "*Pseudanaphora quadrellus* B. & McD., Palmerlee, Arizona." This type, along with a series of "cotypes" representing *quadrellus*, has recently been assigned a type number during the course of this revision. Since the taxonomy of this group is at present based almost entirely upon the ♂♂ of the various species, it is best to select ♂♂ for holotypes. However, the ♀ representing *quadrellus* may be correlated with the ♂♂ with reasonable certainty by reference to the Museum's determined series from which it was originally selected. This series contains a number of both sexes, all from the same locality and all labeled as "cotypes." My examination of a slide preparation of ♂ genitalia labeled "*Acrolophus quadrellus* B. & McD., Cotype, Palmerlee, Ariz." confirmed the identity of this species. Carl Heinrich loaned me two slide preparations of genitalia representing both the ♂ and ♀ paratypes of *quadrellus*. These mounts furnished further confirmation of the identity of this moth.

Contrary to the comments accompanying the original description of *quadrellus*, the latter is not at all closely related to *davisellus*.

Barnes and Lindsey (1921) have published an excellent photograph of a preparation of the entire ♂ genitalia of *quadrellus* in ventral aspect.

41. *Acrolophus minor* (Dyar)

FIGURES 190–195

Pseudanaphora davisellus subsp. *minor* Dyar, 1903, List North Amer. Lep., p. 579, no. 6601a, Jan. (only briefly mentioned in Dyar's list and rather questionable as a formal description).

Homonymus coloradellus Walsingham, 1907, Proc. U.S. Nat. Mus., vol. 33, no. 1567, p. 228, Oct. (New synonymy.)

Acrolophus coloradellus Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8177.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9563.

Acrolophus davisellus minor Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8193a.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 104, no. 9583a.

Apparently, Dyar's only published "description" of his "subspecies" consists of these words appearing in his check list of 1903:

Pseudanaphora davisellus Beut. subsp. *minor* Dyar—Smaller (than *davisellus*), the pale marks grayer and more contrasted. Ariz., Tex.

Actually, *minor* is a distinct species. Although it may superficially resemble *davisellus*, the two species are not at all closely related. Thus, the combination, *Acrolophus minor* (Dyar), may be considered a new combination since *minor* is here elevated from subspecific to specific rank. This species has a single synonym, *coloradellus*, thoroughly described externally by Walsingham in 1907. To augment Dyar's extremely brief, inadequate, and unillustrated description of *minor*, Lord Walsingham's description of *coloradellus* follows:

Homonymus coloradellus

Antennae cinereous.

Palpi erect, reaching scarcely above the base of the antennae, thickly clothed throughout; mixed brownish ochreous and brownish fuscous, appearing slightly paler than the head and thorax above and below them.

Head and thorax are brownish fuscous, the scales tipped with hoary gray.

Forewings rather narrow, of about equal width throughout, except at the extreme base, the width equal about one-third the length, termen slightly convex, oblique, apex rounded.

Neuration 12 veins, all separate; dull cinereous, with some paler hoary patches running along the fold to the end of the cell, thickly sprinkled throughout with brownish ochreous and dark fuscous scales which are concentrated in some small patches, one at the end of the cell, one on, and one immediately above the fold beyond it, with a series of very obscure costal spots; cilia brownish fuscous, slightly paler along their base and mixed with brownish ocherous about the tornus; underside uniformly brownish fuscous, with narrowly pale margins.

Alar expanse.—24 mm.

Hindwings, 8 veins, all separate; slightly wider than the forewings; brownish fuscous; cilia with some paler markings.

Abdomen (missing).

Legs brownish fuscous.

Type.—Male (Walsingham determined, No. 4749, 1906), Cat. No. 10360, U.S.N.M.

Habitat.—Custer County, Westcliff, Colorado. (Collection Beutenmüller). Unique.

This agrees with the genus *Homonymus*, described from South America, but differs from the only species at present known in its shorter palpi and by the absence of deep purple coloring in the hindwings, as well as by the somewhat different pattern of the obscure markings on the forewings.

Male genitalia.—Vinculum typical, as in other species.

Tegumen glabrous; lateral arm broadest in central portion, extremities narrowing, cephalic margin sublinear, caudal margin irregularly rounded; dorsal area narrow, margins sublinear; weakly sclerotized, finely pitted, transverse area lying between and fusing with caudal margin of tegumen and cephalic margin of base of uncus.

Harpe simple, rather elongate and slender (especially in apical portion). Lateral aspect: costa and sacculus fused, comprising approximate basal half of harpe, glabrous except for punctate and setose ventrocaudal area of sacculus, broadest just basad of this area, central portion somewhat expanded dorsad and ventrad, basal portion evenly narrowing to narrow basal extremity, approximate apical fourth somewhat narrowed ventrad. Cucullus somewhat variable, considerably more robust in some specimens than in others, indistinctly fused with costa and sacculus, basal half sparsely and apical half heavily punctate and setose ectad and entad, approximate basal third directed slightly dorsad and narrowing distad, approximate apical two-thirds directed somewhat ventrad and gradually expanding toward apex; apex approximately as broad as base, somewhat reduced ventrad, broadly but unevenly rounded.

Transtilla with arm glabrous, well sclerotized, somewhat sinuate, approximately one-fourth as long as harpe, subparallel with margin of costa, apical fifth converging to costa, terminating subacutely near basal extremity of harpe.

Uncus single. Dorsal aspect: base set off from tegumen by areas of reduced sclerotization, rather broad, cephalic margin with broad and shallow mesal emargination occupied by finely pitted transverse area, laterobasal extremities irregularly rounded, lateral margins converging distad quite sharply into uncal process; uncal process of medium width and length, curving caudoventrad, well sclerotized, with median longitudinal suture becoming obsolete toward apex, base sparsely punctate and setose, narrowing only slightly toward subacute apex.

Gnathos fused, large and broad, considerably flattened dorsoventrad, curving ventrocaudad, large mesal portion rather weakly sclerotized

(especially toward base), lateral margins well sclerotized and scobinate, apex broadly and evenly rounded or weakly emarginate.

Anellus large, membranous, armed ventrad with juxta. Juxta fused with basal portions of harpes and may represent developments of latter, located slightly ventrad of and articulated to dorsal margins of approximate basal three-eighths of harpes, lying just ventrad of and serving as fulcrum for aedeagus, consisting of two heavily sclerotized processes connected by membranous mesal area; processes subparallel throughout most of their length, basal portions converging and fusing with bases of harpes, apical portions somewhat expanded and divergent, basal and apical portions curving somewhat ventrad in lateral aspect.

Aedeagus rather short and slender, approximately five-eighths as long as harpe, cylindrical, asymmetrical, approximately linear in dorsal and ventral aspects, in lateral aspect apical three-fifths considerably narrowed and directed ventrad at angle of 45° and basal two-fifths irregularly expanding toward basal extremity, in dorsal aspect approximate basal fifth very broadly expanded laterad and emarginate dorsad, apical two-fifths to one-half opening broadly and irregularly dorsad and consisting of rather broad ventral strip produced ventrad near apex into prominent nodelike swelling; apex irregularly rounded and armed with approximately 10–12 small, unequally sized, well sclerotized, finely acute, spinelike processes directed distad.

Vesica medium sized, membranous, unarmed.

Type.—Type ♂ (type no. 1843) in the U.S. National Museum.

Type locality.—Kerrville, Kerr Co., Tex.

Distribution.—Texas westward to Arizona and northward to Kansas and Colorado.

Sources of material.—American Museum of Natural History (1 ♂); Denison University (3 ♂♂); Illinois State Natural History Survey (1 ♂); University of Kansas (1 ♂).

Specimens examined.—6 (all ♂♂), from 5 localities:

Arizona: Boulder Springs, Mohave Co., 2 ♂♂ (July 1–15, 1921, one specimen with mite on base of forewing, other with mite on abdomen, O. C. Duffner); Hualapai Mountains, ♂ (July 15–30, 1921, O. C. Duffner); McNary, Apache Co., ♂ (June 19, 1940, G. E. Pollard). Kansas: Clark Co., ♂ (June, elevation 1962 feet, F. H. Snow). Texas: Locality and date unknown, ♂ ("Tex.," Andreas Bolter collection).

Remarks.—This species probably ranges southward into Mexico. It is here recorded from Colorado on the basis of its synonym, *coloradellus* (Walsingham), the holotype ♂ of which was collected in Custer County, Colorado.

A. minor is not closely related to any of the other acrolophids known to occur in America north of Mexico. It is related to those species having shortened labial palpi, naked eyes, and complex an-

tennae in which each segment is clothed only dorsad or dorsolaterad with scales. Its antennae are of a reduced bipectinate type similar to, but still distinct from, that exhibited by *sinclairi nelsoni*. In addition, *minor* resembles that subspecies in regard to size, general habitus, labial palpi, and eyes. However, the characteristic antennae, aedeagus, and juxta of *minor* can not be confused with those of the other acrolophids treated in this work.

Dr. Clarke and I have examined the type ♂ specimen at the U.S. National Museum. It is labeled "*Pseudanaphora minor* Dyar, type no. 1843, Kerrville, Texas, April." No attempt was made to remove the genitalia of the type since its abdomen had apparently been glued on following extensive damage by dermestids. However, Dr. Clarke removed the genitalia of a ♂ "cotype" for me. This preparation, along with my examination of the type, definitely confirmed the identity of *minor*.

Walsingham described *Homonymus coloradellus* as a new species in 1907. His description and comments have already been quoted in full to augment Dyar's very brief "description" of *minor* treated above. Since 1907, *coloradellus*, based on a unique ♂ without an abdomen, has appeared in the literature as a distinct species.

The type ♂ is at the U.S. National Museum. It is labeled "*Homonymus coloradellus* Wlsm., type no. 10360, West Cliff, Custer Co., Colorado, Beutenmueller Collection." Other data with the type are "4749 Wlsm. 1906" and "821 Wlsm. MS." Although the abdomen of *coloradellus* was missing, the color pattern of its wings and its distinctive antennal structure clearly showed it to be equivalent to *minor*, the type ♂ of which I was also able to study at the National Museum. Thus, *coloradellus* (Walsingham) should be considered a new synonym of *Acrolophus minor* (Dyar).

42. *Acrolophus parvipalpus*, new species

FIGURES 196–198

MALE.—Head, labial palpi, and thorax ochreous tinged with white and fuscous. Labial palpi short, heavily clothed with scales, porrect, basal portions closely appressed to head and narrowly separated from each other, apical portions strongly diverging from head and rather broadly separated from each other, apical segments conical and becoming acute at apices. Eyes large, protruding, naked, without lashes. Antennae simple, laminate, ochreous tinged with fuscous, covered dorsolaterad by scales, segmental processes set closely together throughout antennae. Forewings with color pattern somewhat variable, ground color brown, marked with dark brown; markings consisting of small spots along costa, short bar at outer end of cell,

and diffused patch beneath center of fold. Hindwings dark brown, fringes somewhat lighter. Abdomen brown. Wing expanse: 22 to 26 mm.

FEMALE.—Coloration similar to that of ♂, pattern variable as in ♂. Labial palpi and eyes similar to those of ♂. Antennae slender, almost entirely covered by scales, segments globose rather than laminate. Wing expanse: 27 to 29 mm.

MALE GENITALIA.—Vinculum rather large and well sclerotized, but otherwise typical.

Tegumen fairly broad, glabrous; lateral arm somewhat shortened, evenly narrowing to point of articulation with vinculum, margins linear; dorsal area with cephalic margin minutely emarginate mesad, caudal margin with deep and irregular mesal emargination filled by area of weak sclerotization.

Harpe divided, with reduced costal process. Lateral aspect: costa and sacculus fused, large, considerably expanded in all aspects, comprising approximate basal half of harpe, glabrous except for punctate area along ventrocaudal margin of sacculus bearing elongate setae, broadest in apical portion caudad of point of attachment of arm of transtilla, approximate basal five-sevenths evenly narrowing dorsad and ventrad toward narrowly rounded basal extremity; costal process not greatly developed but very distinct, slightly shorter than arm of transtilla, originating at dorsocaudal extremity of costa, base broad, margins converging caudad to rather narrowly rounded apex, directed caudad and curving somewhat mesad, dorsal margin evenly continuous with that of arm of transtilla. Cucullus separated dorsad from costa and ventrad from sacculus by areas of reduced sclerotization, directed somewhat ventrad, approximate central half considerably flattened dorsoventrad and appearing quite slender in lateral aspect, approximate apical half of ventral margin heavily punctate and setose entad, remainder of cucullus very sparsely punctate and setose, approximate basal half with dorsal and ventral margins heavily sclerotized, basal and apical thirds somewhat expanded dorsad and ventrad; apex broad, dorsal margin broadly and evenly rounded, ventral margin narrowly rounded.

Transtilla with arm short, stout, well sclerotized, glabrous, approximately one-sixth as long as harpe, broadly separated from and extending subparallel to dorsal margin of costa, terminating subacutely far caudad of basal extremity of harpe.

Uncus obscurely bifid. Dorsal aspect: base rather small, glabrous, entirely set off from tegumen by broad areas of reduced sclerotization, lateral margins heavily sclerotized and converging rather sharply distad into main uncal process; angle of bifurcation minute, acute, located approximately at midpoint of main uncal process; furcae

rather short, well sclerotized, approximate, appearing almost as single process in dried specimens, directed caudad and curving slightly ventrad, lateral margins punctate and setose, apices acute.

Gnathos fused, width medium, slightly elongate, curving ventrocaudad, major mesal portion rather weakly sclerotized (especially toward base); apical portion slightly thickened dorsoventrad, clothed ventrad with minute seta-like processes, dorsal surface scobinate and armed with numerous minute processes; lateral margins very heavily sclerotized, gradually converging distad into evenly rounded apex.

Anellus large, membranous, dorsolateral portions articulating with costal processes of harpes densely clothed with minute seta-like processes, juxta absent.

Aedeagus slender, approximately as long as harpe, cylindrical, asymmetrical, linear in dorsal and ventral aspects, slightly sinuate in lateral aspect; base weakly expanded, emarginate ventrad, opening dorsad, approximate basal fourth curving slightly dorsad; approximate apical third curving somewhat ventrad, slightly expanding distad, broadly opening sinistrad; apex rather broad and very irregular, armed dextrad with rather small, well sclerotized, acute, spinelike process directed dextrad.

Vesica rather large, membranous; small area near apex clothed with numerous, minute, seta-like processes.

TYPE.—Holotype ♂ (type no. 61448) in the U.S. National Museum.

PARATYPES (21 ♂♂, 2 ♀♀).—American Museum of Natural History (2 ♂♂); California Academy of Sciences (1 ♂); Denison University (14 ♂♂, 1 ♀); U.S. National Museum (3 ♂♂, 1 ♀); University of Kansas (1 ♂).

TYPE LOCALITY.—Palmerlee, Cochise Co., Ariz. (date and collector not available).

DISTRIBUTION.—Western United States. Arizona and Utah.

SPECIMENS EXAMINED.—24 (22 ♂♂, 2 ♀♀), from 8 localities:

ARIZONA: Boulder Springs, Mohave Co., 13 ♂♂, ♀ (July 1–15, 1921, 1 ♂ with mite on wing, ♀ with abdomen missing, O. C. Duffner); Chiricahua Mountains, ♂ (July 1–5, 1927, elevation 9000 to 9800 feet, J. A. Kusche); Huachuca Mountains, ♂ (date and collector unknown, this specimen also bears the label, "*Macrotinea anaphorella* Busck, Cotype." Apparently, it was one of a series of specimens representing an unpublished or manuscript species); Hualapai Mountains, ♂ (July 15–30, 1921, O. C. Duffner); Oak Creek Canyon, ♂ (Aug., elevation 6000 feet, abdomen missing, F. H. Snow); Palmerlee, Cochise Co., ♂ (date and collector unknown); Santa Rita Mountains, ♂ (June 19, 1898, E. A. Schwarz); locality and date unknown, ♂, ♀ ("Arizona," Wm. Schaus collection), ♂ ("Ariz., Chas. Palm, Don. 1911."). UTAH: Bluff, San Juan Co., ♂ (Cottonwood Canyon, June 25-July 2, 1933, elevation 4200 feet, A. B. Klots collection).

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REMARKS.—This species undoubtedly ranges southward into Mexico. It is not closely related to any of the other acrolophids known to occur in America north of Mexico. In general, *A. parvipalpus* is related to those species having short labial palpi, naked eyes, and laminate antennae covered only dorsad by scales. It may easily be distinguished from the other members of the genus by its unusually short labial palpi and its oddly shaped harpe. The cucullus of the latter structure in *parvipalpus* has its major central portion markedly flattened dorsoventrad so as to appear quite slender in lateral aspect. In addition, the costa of the harpe is produced dorsocaudad into a distinct costal process. The genital structure of this species is quite consistent throughout my series of specimens. The name, *parvipalpus*, refers to the considerably reduced labial palpi exhibited by this species.

43. *Acrolophus davisellus* Beutenmüller

FIGURES 199–201

Acrolophus davisellus Beutenmüller, 1887, Ent. Amer., vol. 3, no. 7, p. 139, Oct.—Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5058.—Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8193.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 104, no. 9583.

Pseudanaphora davisellus Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 310; 1900, Can. Ent., vol. 32, no. 11, p. 327; 1903, List North Amer. Lep., p. 579, no. 6601.—Barnes & McDunnough, 1913, Can. Ent., vol. 45, no. 12, p. 421.

Beutenmüller's original description follows:

Acrolophus Davisellus—Head and thorax, fuscous, mixed with grayish scales, labial palpi short, ascending, but not recurved over the head and thorax, deep brown outside, and ochreous inside. Primaries, fuscous, irregularly mottled with deep brown patches, forming a sub-lunate dash, running from the disc nearly to the apex, and another patch on the fold about the middle of the wing, below which there is a dirty white space running along the middle third of the internal margin, other dirty white scales scattered over the wings, cilia brown, with pale spots. Secondaries and cilia fuscous. Expanse of wings ♂, 28 mm. ♀, unknown. 1 ♂, Arizona.

The species is allied to *A. arcanella*, Clem. Named in honor of my friend Wm. T. Davis of Staten Island, N.Y., an earnest and closely observing entomologist.

MALE GENITALIA.—Vinculum rather large and well sclerotized, otherwise typical.

Tegumen of medium width, glabrous; lateral arm gradually narrowing to point of articulation with vinculum, margins rather heavily sclerotized, caudal margin weakly sinuate; dorsal area with cephalic margin concave, caudal margin convex and indistinctly fusing with base of uncus.

Harpe simple, but with large ventrobasal development of sacculus. Lateral aspect: costa and sacculus fused, shortened but markedly expanded ventrad and mesad, comprising slightly less than basal three-sevenths of harpe, glabrous except for ventral development of sacculus, broadest near apical extremity, approximate basal half strongly narrowing to acute basal extremity, ental portion of sacculus strongly developed mesad and ventrad into prominent process best seen in ventral aspect; process of sacculus large, broad, well sclerotized, extending as far caudad as apical extremity of sacculus, approximate basal three-fifths fused with sacculus, apical two-fifths free and expanding toward apex, apical fifth rather sparsely punctate, apex with broad and shallow emargination, lateral extremity of apex narrowly rounded, mesal extremity of apex acute. Cucullus somewhat variable, more slender in some specimens than in others, indistinctly fused with costa and sacculus, elongate, slender, base rather weakly punctate, remainder of cucullus becoming more heavily punctate entad and ectad toward apex, approximate apical third heavily setose entad and curving mesad, approximate apical two-thirds curving somewhat ventrad, basal half with margins well sclerotized and parallel, apical half with ventral margin gradually expanded ventrad to give apical third capitate appearance, apex broadly and evenly rounded.

Transtilla with arm well sclerotized, glabrous, approximately one-fourth as long as harpe, basal half divergent from and apical half convergent with dorsal margin of costa, apical fourth curving ventrad beyond basal extremity of harpe, apex acute.

Uncus single, partially and indistinctly separated from tegumen by areas of reduced sclerotization. Dorsal aspect: base large, mesal portion rather weakly sclerotized and glabrous; lateral margins heavily sclerotized, sparsely punctate and setose, sinuate, converging caudad into base of uncal process. Uncal process of medium length, rather robust, heavily sclerotized, curving strongly ventrad, apex subacute.

Gnathos weakly paired, well sclerotized (especially along lateral margins), directed ventrocaudad; arms very short, separated by shallow apical emargination, well sclerotized, rather weakly scobinate dorsad, apices broadly and evenly rounded.

Anellus medium sized, membranous, unarmed, juxta absent.

Aedeagus medium sized, approximately five-sevenths as long as harpe, cylindrical, moderately asymmetrical, sublinear in dorsal and ventral aspects, in lateral aspect basal and apical portions curving ventrad through total arc of approximately 135°; base very broadly expanded laterad and ventrad, flattened, platelike, opening broadly cephalodorsad; central third rather slender, tubular; approximate apical

third somewhat expanded, opening both dextrad and sinistrad, consisting of well sclerotized dorsal and ventral walls; dorsal wall of apical third glabrous, rather slender, narrowing to subacute apex; ventral wall of apical third broader and armed with numerous, small, acute, well sclerotized, spinelike processes directed distad.

Vesica rather small, membranous, unarmed.

TYPE.—Type ♂ (type no. 407) in the U.S. National Museum.

TYPE LOCALITY.—"Arizona."

DISTRIBUTION.—Southwestern United States. Arizona.

SOURCES OF MATERIAL.—American Museum of Natural History (25 ♂♂, 2 ♀♀); California Academy of Sciences (4 ♂♂); Carnegie Museum (2 ♂♂); University of Kansas (1 ♂).

SPECIMENS EXAMINED.—34 (32 ♂♂, 2 ♀♀), from 9 localities:

ARIZONA: Chiricahua Mountains, Cochise Co., 2 ♂♂ (Rustler Park, July 15, 1927, elevation 9000 feet, J. A. Kusche), ♂ (Flys Peak, July 18, 1927, elevation 9000 to 9800 feet, Kusche), ♂ (July 30, 1927, elevation 9000 to 9800 feet, Kusche); Chiricahua National Monument, Cochise Co., ♂, ♀ (July 15, 1948, C. & P. Vaurie); Garces, ♂ (Sept. 12, Biederman); Huachuca Mountains, 8 ♂♂, ♀ (Ramsay Canyon, July 10–15, 1941, one ♂ with mite on abdomen, A. B. Klots); Huachuca Mountains, Cochise Co., ♂ (Ramsay Canyon, July 16, 1948, C. & P. Vaurie); Paradise, Cochise Co., ♂ (Aug., O. C. Poling); Portal, Cochise Co., ♂ (Cave Creek Canyon, July 13, 1948, C. & P. Vaurie); Prescott, Yavapai Co., 14 ♂♂ (July 25, 1948, C. & P. Vaurie); Santa Rita Mountains, ♂ (July, elevation 5000 to 8000 feet, F. H. Snow).

REMARKS.—This is Beutenmüller's only valid species of *Acrolophus* described from America north of Mexico. It undoubtedly ranges southward into Mexico. It is related to those acrolophids having shortened labial palpi, naked eyes, and antennae covered only dorsad or dorsolaterad by scales. *A. davisellus* is very closely related to *serratus*, the two comprising a small species group. As characterized in the key, this group consists of robust species in which the labial palpi are recurved and rather closely appressed to the head, the sacculus of the harpe is developed mesoventrad into a prominent process usually visible in ventral aspect in dried specimens, the gnathos is rather weakly paired and flattened beneath, and the uncus is simple.

A. davisellus may be easily distinguished from its close relative, as well as from the other acrolophids treated here, by its short labial palpi, laminate antennae, color pattern, moderately capitate harpe, and spinose aedeagus. These features are described in more detail in couplet 53 of the key. The genital characters of *davisellus* are consistent throughout my series of specimens.

I have examined the type ♂ specimen at the U.S. National Museum. It is labeled "*Acrolophus davisellus* Beut., type no. 407, Arizona, 339, Through C. V. Riley." This specimen confirms the identity of this species. Contrary to the brief comment accompanying the original

description of *davisellus*, the latter is not at all closely related to *arcanellus*.

Dyar (1900, p. 310) referred to *davisellus* as follows: "Uncus single, long and slender—Though described as an *Acrolophus*, this is obviously referable to *Pseudanaphora*, from the short erect palpi—Fort Grant, Arizona, July 20 (H. G. Hubbard)." In his list of 1903, Dyar also reported this species from Texas, on the basis of his "subspecies," *minor*. However, *minor* is a distinct species. I know of no valid record for *davisellus* outside of Arizona.

44. *Acrolophus serratus*, new species

FIGURES 202–205

MALE.—Head brown. Labial palpi of intermediate length, recurved back over head and extending over anterior margin of thorax, rather narrowly separated from each other, rather heavily clothed with short scales, segmentation clearly visible despite vestiture, basal portions closely appressed to head, apical portions diverging from head and thorax distad, inner surfaces ochreous, outer surfaces heavily suffused with fuscous. Eyes large, protruding, naked, sparsely lashed. Antennae transitional in form between laminate and unipectinate types, ochreous, covered dorsad by brownish scales; segmental processes somewhat flattened laterad but also somewhat thickened transversely, nearly contiguous in basal portions of antennae but becoming progressively more widely spaced from one another toward apical portions of antennae. Forewings with ground color glossy brown, marked with dark brown, pattern variable; markings commonly consisting of small bars or spots along costa, diffused patch at outer end of cell merging with large subtriangular patch on and below center of fold, and large spot on fold near base; outer and posterior margins rather pale, with faint brownish markings. Hindwings glossy brown, fringes slightly lighter. Abdomen brown, basal portions densely overlaid with elongate hairs. Wing expanse: 26 to 30 mm.

FEMALE.—Coloration similar to that of ♂, pattern variable as in ♂. Labial palpi considerably shorter than in ♂, partially recurved back over head and extending well above antennal bases, densely clothed with slender scales, basal portions closely appressed to head and to each other, apical portions diverging from head and from each other distad. Eyes essentially same as those of ♂. Antennae simple, slender, clothed with scales except along ventral surfaces. Wing expanse: 32 to 36 mm.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen of medium width, glabrous; lateral arm gradually narrowing to point of articulation with vinculum, margins heavily sclerotized;

dorsal area with cephalic margin emarginate mesad, caudal margin convex and separated from base of uncus by irregular transverse area of reduced sclerotization.

Harpe simple. Lateral aspect: costa and sacculus fused, considerably shortened but somewhat expanded in all aspects, comprising approximate basal three-sevenths of harpe, glabrous except in ventral and ental portions of caudal extremity, broadest in apical third, basal half strongly narrowing to very narrow basal extremity; ventrocaudal margin of sacculus digitate, punctate, setose; caudal margin of sacculus developed strongly entad into prominent, heavily sclerotized, finely dentate process directed caudad. Cucullus only partially separated from costa and sacculus by irregular area of reduced sclerotization, elongate, very slender, approximate apical half curving somewhat ventrad and mesad, margins well sclerotized and subparallel, basal and apical areas slightly expanded, base weakly punctate and setose, remainder of cucullus gradually becoming more heavily punctate and setose entad and ectad toward apex, apex evenly rounded.

Transtilla with arm well sclerotized, glabrous, approximately one-fifth as long as harpe, broadly separated and slightly divergent from dorsal margin of costa, terminating subacutely as far cephalad as basal extremity of harpe.

Uncus single, partially and indistinctly separated from tegumen by areas of reduced sclerotization. Dorsal aspect: base large, subtriangular, large mesal portion weakly sclerotized and glabrous; lateral margins heavily sclerotized, sparsely punctate and setose, linear, converging caudad into base of uncal process. Uncal process rather short, robust, heavily sclerotized, curving strongly ventrad; apex very sparsely punctate and setose, acute.

Gnathos paired, heavily sclerotized (especially along lateral margins), directed ventrocaudad; arms short, broad, closely parallel, scobinate dorsad, apices broadly and bluntly rounded.

Anellus rather small, membranous, unarmed, juxta absent.

Aedeagus somewhat reduced, approximately two-thirds as long as harpe, asymmetrical, sublinear in dorsal and ventral aspects; approximate basal half somewhat expanded, cylindrical; approximate apical half abruptly narrowed, curving ventrad through angle of 45°, opening broadly ventrad and consisting of narrow dorsal strip narrowing to subacute apex; small dorsodextral area near center of apical half armed with approximately six minute, acute, well sclerotized, spinelike processes appearing as serrate dextral margin in dorsal aspect.

Vesica small, elongate, slender, membranous, apparently unarmed.

TYPE.—Holotype ♂ and allotype ♀ in the California Academy of Sciences at San Francisco.

PARATYPES (9 ♂♂, 2 ♀♀).—American Museum of Natural History (2 ♂♂, 1 ♀); California Academy of Sciences (5 ♂♂); U.S. National Museum (1 ♂, 1 ♀); University of Kansas (1 ♂).

TYPE LOCALITY.—Patagonia, Santa Cruz Co., Ariz. (Aug. 1, 1924, E. P. Van Duzee).

DISTRIBUTION.—Southwestern United States. Southern Arizona.

SPECIMENS EXAMINED.—13 (10 ♂♂, 3 ♀♀), from 2 localities:

ARIZONA: Patagonia, Santa Cruz Co., ♂ (Aug. 1, 1924, J. O. Martin), 5 ♂♂, ♀ (Aug. 1, 1924, E. P. Van Duzee), ♂, ♀ (Aug. 2, 1924, Van Duzee), 2 ♂♂, ♀ (July 18, 1948, C. & P. Vaurie); San Bernardino Ranch, Cochise Co., ♂ (Aug., elevation 3750 feet, F. H. Snow).

REMARKS.—This species undoubtedly ranges southward into Mexico. It is closely related to *davisellus*, the two comprising a small species group. *A. serratus* may be distinguished from its close relative, as well as from the other species treated here, on the basis of a number of external and internal features described in detail in the key. In *serratus* the labial palpi are of intermediate length, the antennae are of a type that is transitional between the laminate and unipectinate forms, the color pattern is fairly characteristic and constant, the cucullus of the harpe is very slender and not appreciably capitate, and the apical portion of the aedeagus is weakly dentate or serrate. The genital structure is consistent throughout my series of specimens representing *serratus*. In the *davisellus-serratus* species group, the peculiar mesoventral process of the sacculus may be used both to relate and to separate the two species.

The name, *serratus*, refers to the serrate margin of the aedeagus.

45. *Acrolophus seculatus*, new species

FIGURES 206–207

Female unknown.

MALE.—Similar to *variabilis* in general habitus, but much smaller and more fragile. Head ochreous fringed with white. Labial palpi shortened, fuscous suffused with ochreous, partially recurved over head, partially erect, extending considerably above head, rather narrowly separated from each other, major portions gradually diverging from head distad, each segment heavily clothed with scales developing into prominent tuft along anterior margin, segmentation clearly visible despite vestiture. Eyes large, protruding, naked, sparsely lashed. Antennae simple, ochreous, segments globose; each segment completely encircled by ring of short, brown scales. Forewings brown, marked with dark brown and fuscous, pattern variable; markings commonly consisting of small spots or bars along apical half of costa, suffused patch at outer end of cell merging with larger patch on center of fold, small spot below fold near base, and

pale areas minutely sprinkled with fuscous in apical third and below fold. Hindwings glossy brown, fringes slightly lighter. Abdomen brown. Wing expanse: 13 to 15 mm.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen with lateral arm glabrous, broad, evenly narrowing to point of articulation with vinculum, margins sublinear; dorsal area glabrous, broad, fusing into base of uncus.

Harpe simple. Lateral aspect: sublinear, somewhat similar to that of *simulatus*. Costa and sacculus fused, comprising slightly more than basal half of harpe, glabrous except for punctate and setose ventrocaudal margin of sacculus, apical half evenly expanded dorsad and ventrad, basal half extremely slender; ental area from base to apex produced dorsad in form of large, rounded, rather weakly sclerotized expansion extending considerably beyond base of arm of transtilla. Cucullus rather indistinctly fused with costa and sacculus, elongate, slender, heavily punctate, sparsely setose (especially in basal and apical areas), margins sublinear and parallel; apex with ventral portion broadly and evenly rounded, dorsal portion produced somewhat distad and narrowly rounded.

Transtilla with arm glabrous, well sclerotized, approximately one-fourth as long as harpe, diverging considerably from costal margin, apical portion curving strongly ventrad toward costal margin, terminating subacutely somewhat above base of harpe.

Uncus simple. Dorsal aspect: base fused with tegumen; heavily punctate except for narrow, glabrous, mesal area; lateral margins well sclerotized, linear, evenly converging into uncal process. Uncal process distinct from basal area by its greater degree of sclerotization, glabrous, length and width medium, curving caudoventrad, apex acute.

Gnathos fused, short, broad, rather weakly sclerotized, curving almost directly ventrad; apical portion thin, flattened, finely scobinate entad; apex broadly and evenly rounded.

Anellus membranous, unarmed, juxta absent.

Aedeagus elongate, slender, subsymmetrical, glabrous, sublinear in dorsal and ventral aspects, basal half irregularly curving ventrad through angle of approximately 90° in lateral aspect, apical half with some additional ventral curvature; approximate basal fifth slightly expanded, cylindrical; approximate apical four-fifths opening dorsad with aperture becoming gradually wider distad throughout central third of aedeagus and resulting in reduction of apical third to very slender, linear, well sclerotized, ventral strip terminating subacutely.

Vesica membranous, unarmed, slender, extremely elongate, arising dorsad from approximate apical four-fifths of aedeagus but well extruded only from approximate apical half of aedeagus.

TYPE.—Holotype ♂ (type no. 61449) in the U.S. National Museum.

PARATYPES (8 ♂♂).—California Academy of Sciences (1 ♂); U.S. National Museum (7 ♂♂).

TYPE LOCALITY.—Baboquivari Mountains, Pima Co., Ariz. (Aug. 15–30, 1924, O. C. Poling).

DISTRIBUTION.—Southwestern United States. Southern Arizona.

SPECIMENS EXAMINED.—9 (all ♂♂), from 2 localities:

ARIZONA: Baboquivari Mountains, Pima Co., 3 ♂♂ (July 15–30, 1923, elevation 5000 to 7000 feet, O. C. Poling), ♂ (Aug. 1–15, 1923, Poling), 2 ♂♂ (July 1–15, 1924, Poling), 2 ♂♂ (Aug. 15–30, 1924, Poling); Pinal County, "14 miles east of Oracle," ♂ (July 27, 1924, E. P. Van Duzee).

REMARKS.—This species undoubtedly ranges southward into Mexico. Due to the characters selected for the construction of my key, *A. seculatus* is represented there as related to those species having shortened labial palpi, naked eyes, simple antennae with segments encircled by rings of scales, simple uncus, and fused gnathos. However, *seculatus* exhibits so many affinities with the *variabilis-macrophallus-vauriei* species group that it should be considered a fourth member of the latter. This species group, characterized in the key and in the remarks on the following species, *variabilis*, falls within that general series of acrolophids having a type of antenna in which each segment is clothed only dorsad or dorsolaterad with scales. Since each antennal segment of *seculatus* is completely encircled with one ring of scales, this species and its related group emerge at different points in the key.

A. seculatus is probably less closely related to *variabilis*, *vauriei*, and *macrophallus* than are the latter three to one another. In addition to the difference in antennal vestiture mentioned above, *seculatus* may be easily distinguished from its closer relatives on the basis of its considerably smaller size, the shape of its harpe, and its oddly sickle-shaped aedeagus. The various characters of the genitalia are both consistent throughout my small series of *seculatus* and distinct from those of all the other species treated in this work.

Superficially, *seculatus* perhaps most closely resembles *pyramellus* in size and general habitus, although the two may also be separated by external characters. The antennal scales of *seculatus* are short and extend less than half the length of each segment while the antennal scales of *pyramellus* are long and extend more than half the length of each segment. Further, the ventral vestiture of the labial palpi of *seculatus* is heavier and more tuftlike than it is in *pyramellus*.

Among the specimens received from Cornell University is a single ♂ specimen labeled "Sanderson, Texas, May 16, 1918, J. Ch. Bradley" and a microscope slide mount, presumably of its genitalia. Externally, this moth agrees very closely with my series of specimens from Arizona representing *seculatus*. However, the genitalia in the accompanying slide mount, although undoubtedly belonging to *Acrolophus*,

represent an entirely different species with which I am not familiar. Thus, I am in doubt as to the correctness of the association between this specimen and the slide mount of the genitalia. The name refers to the characteristic sickle-shaped aedeagus exhibited by this species.

46. *Acrolophus variabilis* (Walsingham)

FIGURES 208–213

Orthologhus variabilis Walsingham, 1887, Trans. Ent. Soc. London, p. 169, pl. 8, figs. 24, 24a, 24b, 24c, June.—Beutenmüller, 1888, Ent. Amer., vol. 4, no. 2, p. 29.—Smith, 1891, List Lep. Bor. Amer., p. 95, no. 5065.—Dyar, 1900, Can. Ent., vol. 32, no. 10, p. 310; 1900, Can. Ent., vol. 32, no. 11, p. 327; 1903, List North Amer. Lep., p. 579, no. 6598.—Walsingham, 1915, Biol. Centr.-Amer., pt. 12, vol. 4, pp. 378, 385–386.

Acrolophus variabilis Barnes & McDunnough, 1917, Check List Lep. Bor. Amer., p. 191, no. 8188.—Eyer, 1924, Ann. Ent. Soc. Amer., vol. 17, no. 3, p. 315, pl. 35, fig. 4.—McDunnough, 1939, Check List Lep. Can. & U.S. Amer., p. 103, no. 9578.

Walsingham's original description follows:

Orthologhus variabilis—Labial palpi, ♂, erect, not recurved, dirty whitish, more or less tinged with greyish fuscous, with which they are sometimes entirely suffused, about 3½ mm. long, separately tufted on each joint; ♀ porrect, standing out about 2 mm. beyond the head. *Antennae* subochreous; ♂ serrated; ♀ simple. *Head, thorax, and fore wings* dirty whitish, sprinkled and suffused with greyish fuscous, varying with the colour of the fore wings. *Fore wings* elongate, narrow, the costa slightly rounded, apex rounded, apical margin oblique, convex, presenting several varieties of colouring; apical vein not forked. Var. a. dirty whitish, mottled along the apical and costal margins with greyish fuscous; a triangular fuscous patch overlapping the fold, and more or less connected with a spot of the same colour at the end of the cell; fringes mottled alternately greyish fuscous and dirty white both in fore and hind wings. Var. β. greyish fuscous, with scarcely any admixture of whitish scales, the darker fuscous patches distinctly visible, and a few brownish ochreous scales on the disc. Var. γ. pale greyish fuscous, the dark patches almost obsolete, with no admixture of whitish scales, except in the fringes. *Hind wings in all the varieties* brownish, with a slight purplish tinge; the fringes scarcely paler. *Abdomen* pale greyish fuscous; lateral claspers of nearly even width from the base outwards, slightly angulated downwards about their middle, the ends rounded, but more so below than above; uncus single, evenly bent over, but very little longer than its opposing branch coming from beneath it. *Exp. al.* ♂, 24–27 mm.; ♀, 30–34 mm.

I have a considerable series of this species collected by Morrison in Arizona, and had always regarded it as equivalent to *mortipennella*, Gr., the only described species with whitish fore wings and darker hind wings; but Mr. Grote's remark that in his species the labial palpi reach as far back as the dorsum of the thorax proves that it is distinct.

Walsingham's illustrations consisted of: figure 24, the adult ♂ in dorsal aspect (in color); figure 24a, the head of the ♂ in lateral aspect; figure 24b, the head of the ♀ in lateral aspect; and figure 24c, the ♂ genitalia—the uncus, gnathos, and the cucullus of the harpe in lateral aspect and the uncus in dorsal aspect.

MALE GENITALIA.—Vinculum rather large and elongate, retracted well into abdomen in dried specimens.

Tegumen glabrous; lateral arm elongate, very slender at point of articulation with vinculum, gradually expanding dorsocaudad toward dorsal area; dorsal area broad, not separated along meson.

Harpe simple. Lateral aspect: greatly elongated, approximate basal third very slender, central third expanding dorsad and ventrad to about four times width of basal third, approximate apical third narrowed to about half width of central third; costa and sacculus fused, greatly elongate, comprising approximate basal two-thirds to three-fourths of harpe, glabrous except for punctate and setose ventrocaudal margin of sacculus, apical two-fifths evenly expanded dorsad and ventrad, basal three-fifths considerably narrowed, basal extremity acute; cucullus set off from costa and sacculus by ventral constriction and dorsal dentations near base, relatively short, comprising apical one-fourth to one-third of harpe, heavily punctate and setose except for glabrous area near base, base somewhat constricted ventrad and invariably produced dorsad into one to several prominent toothlike processes, dorsal and ventral margins otherwise smooth and subparallel, apex broad and bluntly rounded to subtruncate.

Transtilla with arm elongate, slender, approximately one-third as long as harpe, linear to sublinear, well sclerotized, glabrous, gradually narrowing and diverging from dorsal margin of costa toward apex, terminating subacutely considerably distad of basal extremity of harpe.

Uncus simple. Dorsal aspect: base large, subtriangular, rather indistinctly fused with tegumen, large lateral areas heavily punctate; lateral margins well sclerotized, punctate and setose, sublinear, evenly converging distad into base of uncal process; uncal process rather large, robust, slightly flattened and sparsely setose laterad, gradually narrowing and curving ventrad to narrowly rounded apex.

Gnathos fused mesad into broad, rather weakly sclerotized, glabrous flap directed ventrocaudad; dorsal surface convex, ventral surface concave, lateral margins gradually and evenly converging distad into rather narrowly rounded apex.

Anellus rather elongate, membranous; ventral surface slightly thickened and densely clothed with minute, seta-like projections; juxta absent.

Aedeagus very slender, extremely elongate, half again to twice as long as entire genital capsule, extending far back into abdomen when at rest, cylindrical, asymmetrical, base expanded into small U-shaped pouch, apex expanded dorsolaterad; basal two-thirds to three-fourths slender, linear to sublinear; apical quarter to one-third weakly expanded, curving considerably ventrad. Approximate apical quarter

with laterodextral wall flattened, rather weakly sclerotized, and armed with several series of spines as follows (fig. 212): basal series arising from broader portion of aedeagus and consisting of dense cluster of approximately 15–30 heavily sclerotized, acute, variously sized spines directed and becoming progressively larger distad; central series consisting of single, irregular, dorsal row of several to several dozen smaller, variously sized spines extending from basal cluster almost to apex of aedeagus; apex armed with single, rather small, distinct, well sclerotized, acute spine directed distad.

Vesica small, membranous, bulbous, armed at or near apex with single (rarely two) cornutus; cornutus small, well sclerotized, acute, directed distad.

TYPE.—♂ and ♀ types in the British Museum (Natural History).

TYPE LOCALITY.—"Arizona."

DISTRIBUTION.—Southwestern United States. Kansas and Texas westward to California and southward into Mexico and Central America.

SPECIMENS EXAMINED.—291, from 55 localities. The large number of specimens available for study has made it advisable to reduce the distributional data for this common species largely to the localities and months of occurrence:

ARIZONA: Aguila (Aug.); Baboquivari Mountains ("Kits Peak Rincon," Aug., elevation about 3100 to 4050 feet); Baboquivari Mountains (no date); Badger, Santa Cruz Co. (July); "Bill Wms. Fork" (Aug.); Boulder Springs, Mohave County (July); Chiricahua Mountains (July, elevation 8000 to 9800 feet); Dome (July); Elgin (July); Flagstaff (July); Florence (July), (also, "6 miles south of Florence," July); Fort Huachuca (Aug.); Garces (Aug.); Gila Bend (Aug.); Huachuca Mountains (Ramsay Canyon, July); Hualapai Mountains (July); McNary, White Mountains (July); Oracle (July), (also, "14 miles east of Oracle," July, 1 ♀ with mite on abdomen); Palmerlee (no date); Paradise, Cochise County (Aug.); Patagonia (July, Aug.); Pinal Co., "3 miles west of Magna" (Aug.); San Bernardino Ranch, Cochise Co. (Aug., elevation 3750 feet); San Carlos (July); Santa Catalina Mountains (Pepper Sauce and Sabino Canyons, Aug.); Santa Cruz Co. (Aug.); Santa Rita Mountains (June and July, elevation 5000 to 8000 feet), (Florida Canyon, Aug.), (Santa Rita Experimental Range, July); Superior (Boyce Thompson Arboretum, Aug.); Tombstone (Aug.); Tucson (July, Aug., Oct.), (July, at light, elevation 2400 feet), (St. Xavier National Monument, Tucson, July and Aug., 1 ♂ unusually small); Tumacacori National Monument, Santa Cruz Co. (July); Wellton (Aug.). CALIFORNIA: Fort Yuma (Aug.); Mountain Springs (Aug.); Palm Springs (Oct.); Rancho La Sierra, Riverside Co. (Aug., Sept.); San Diego (May, July, Aug.). CANADA: One ♂, with genitalia missing, from the California Academy of Sciences, labeled "Ontario, Canada, Aug., 1909, W. G. Palmer collector." This record is extremely questionable. COLORADO: Mesa Verde National Park (July); Paonia (June and July, light trap). KANSAS: Stanton Co. (July, elevation 3000 feet). MEXICO: San Carlos Bay, Gulf of California (July). NEVADA: Pyramid (July). NEW MEXICO: Lordsburg (July); Luna Co., "10 miles east of Deming" (July); Mesquite, near Mesilla Park (July); State College (July). TEXAS: Davis Monument (Aug.); Fort Davis (July); Marathon (July).

Remarks.—This species is easily the commonest and most widely distributed acrolophid in the southwestern United States. As indicated by the above records, it is especially prevalent in Arizona, the type locality. Besides being one of the older western species, it is also extremely variable in size and coloration. Nevertheless, *variabilis* has no synonyms, at least none from America north of Mexico.

The material representing this species was received on loan from numerous sources. Large series containing both sexes are to be found in the collections of the California Academy of Sciences at San Francisco, the American Museum of Natural History, and Cornell University.

A. variabilis is related to those species having shortened labial palpi, antennae in which each segment is clothed only dorsad or dorsolaterad with scales, simple uncus, and fused gnathos. It is closely related to *seculatus*, *macrophallus*, and *vauriei*, forming with them a distinct species group. As characterized in the key, the *variabilis-seculatus-macrophallus-vauriei* species group consists of rather fragile moths in which the labial palpi are erect instead of appressed to the head; each segment of the palpi is clothed with a prominent tuft of scales along its anterior margin. In addition, this group exhibits a type of gnathos which is fused, concave beneath, and hood-shaped.

A. variabilis may be very easily separated from its close relatives, as well as from all the other acrolophids known to occur in America north of Mexico, on the basis of its distinctive genitalia. Its entire genital capsule is unusually elongate and slender. The dorsal margin of the cucullus of its harpe is prominently emarginate and dentate near the base. Lastly, the apical quarter or third of its aedeagus is heavily armed with a series of variously sized spines. The genital characters are quite consistent throughout my large series of specimens representing *variabilis*.

Mr. Tams of the British Museum (Natural History) has sent photographs labeled "*variabilis* Wals., type" and showing the adult ♂ and ♀ and their respective genitalia. These photographs confirm the identity of this species. In addition, at the U.S. National Museum are various slide preparations of ♂ genitalia, labeled "*variabilis* Wlsm.," agreeing with my concept of this species.

Dyar (1900, p. 310) published a paragraph of distributional data for *variabilis*. Walsingham (1915, p. 386) listed the range of this species as Texas, Colorado, Nevada, California, Arizona, New Mexico, and Central America (Sonora, Mexico—1883, H. K. Morrison).

47. *Acrolophus macrophallus*, new species

FIGURES 214–216

MALE.—Similar to *variabilis* in general habitus, but somewhat smaller. Head pale ochreous. Labial palpi of intermediate length, ochreous suffused with fuscous, erect, extending well above head, basal extremities appressed to head and to each other, major portions well separated from head and from each other, each segment heavily clothed with scales developing into prominent tuft along anterior margin, segmentation clearly visible despite vestiture. Eyes large, protruding, sparsely and finely setose, without lashes. Antennae simple, laminate, ochreous, covered dorsad with scales, segmental processes set closely together throughout antennae. Thorax ochreous fringed with fuscous and white. Forewings brown, marked with dark brown and ochreous, pattern variable; markings commonly consisting of alternate light and dark bars along apical half of costa, ochreous streaks beneath costa and fold, and dark bars in cell and on fold. Hindwings and fringes glossy brown. Abdomen brown. Wing expanse: 17 to 23 mm.

FEMALE.—Coloration similar to that of ♂, pattern variable as in ♂. Labial palpi somewhat shorter than in ♂, directed forward and downward, closely appressed to each other, heavily clothed with scales, segmentation largely obscured by vestiture. Eyes essentially same as those of ♂. Antennae simple, slender, segments entirely encircled by scales. Wing expanse: 22 to 29 mm.

MALE GENITALIA.—Vinculum large, elongate, ventral surface produced considerably caudad.

Tegumen with lateral arm glabrous, greatly elongated, basal half articulating with vinculum very slender, apical half gradually widening caudad; dorsal area of medium width, glabrous, indistinctly fusing with base of uncus.

Harpe simple. Lateral aspect: sublinear, slender, greatly elongated, closest to that of *variabilis*. Costa and sacculus fused, comprising approximate basal two-thirds of harpe, glabrous except for punctate and setose ventrocaudal margin of sacculus, apical third evenly expanded somewhat ventrad and markedly dorsad, central third becoming narrow and attenuated basad. basal third narrow but somewhat expanded dorsad and ventrad slightly before basal extremity, ental area from base to apex produced dorsad in form of weakly sclerotized expansion extending somewhat beyond arm of transtilla and basal two-thirds of costa. Cucullus indistinctly fused with costa and sacculus, rather short and slender, punctate and setose, approximate basal third slender, apical two-thirds gradually and evenly expanding ven-

trad to approximately twice width of narrowest portion of basal third, apex broadly and bluntly rounded.

Transtilla with arm glabrous, well sclerotized, slender, greatly elongated, slightly more than one-third as long as harpe, linear, rather closely subparallel with costal margin of harpe, terminating subacutely somewhat above base of harpe.

Uncus simple. Dorsal aspect: base fused with tegumen and set off only by heavily punctate lateral areas in cephalic half; with elongate, slender, weakly sclerotized, mesal area; lateral margins heavily sclerotized, punctate and setose, sinuate, gradually converging into uncal process. Uncal process distinct from basal area by its greater degree of sclerotization, with lateral margins of basal area sparsely punctate and setose, length and width medium, evenly curving caudoventrad, apex acute.

Gnathos fused, approximately same as that of *vauriei*, broad, length medium, glabrous, curving ventrocaudad, ventral surface slightly concave and broad lateral portions directed strongly downward to give marked hood-shaped appearance; apical portion thin, somewhat upcurved, with lateral margins evenly converging to narrowly rounded apex.

Anellus large, membranous, unarmed, juxta absent.

Aedeagus very long and slender, approximately half again as long as harpe, asymmetrical, glabrous, sublinear in dorsal and ventral aspects, approximate apical two-fifths curving considerably ventrad in lateral aspect; base slightly expanded, with small dorsal opening; approximate basal three-fifths sublinear or sinuate, cylindrical, slightly expanded distad, partially opening dorsad at apical extremity; apical two-fifths abruptly narrowed in lateral aspect to approximately half width of portion immediately basad, considerably flattened dorsoventrad, gradually opening lateroventrad; ventral wall gradually blending with vesica distad, terminating considerably basad of apex; dorsal wall heavily sclerotized and terminating distad in large, acute, heavily sclerotized, spinelike process (wanting in one dissection, possibly through damage) extending beyond vesica.

Vesica elongate; basal portion slender, weakly sclerotized, blending to some extent with apical portions of aedeagus; apical portion irregularly expanding distad, broadest near apex, membranous, extending free beyond apical extremities of aedeagus, curving back toward base of aedeagus through angle of approximately 180°, with numerous transverse infoldings becoming more prominent distad; armed at or near apex with single cornutus and with or without several small, well sclerotized, circular inclusions located at base of cornutus. Cornutus large, approximately same size as spinelike process of aedeagus, well

sclerotized, acute, directed apicad (thus, toward base of aedeagus), extending to or beyond apex of vesica.

TYPE.—Holotype ♂ and allotype ♀ (type no. 61450) in the U.S. National Museum.

PARATYPES (17 ♂♂, 1 ♀).—American Museum of Natural History (6 ♂♂); California Academy of Sciences (4 ♂♂); Carnegie Museum (1 ♂); U.S. National Museum (5 ♂♂, 1 ♀); University of Kansas (1 ♂).

TYPE LOCALITY.—"Southern Arizona" (exact locality, date, and collector not available).

DISTRIBUTION.—Southwestern United States. Arizona and (?) New Mexico.

SPECIMENS EXAMINED.—50 (19 ♂♂, 31 ♀♀), from 12 localities (1 ♂ without data):

ARIZONA: "Babaquivera" Mountains, Pima Co., ♀ (date and collector unknown); Baboquivari Mountains, Pima Co., 4 ♂♂ (July 15–30, 1923, elevation 5000 to 7000 feet, O. C. Poling), ♂ (Sept. 1–15, 1923, Poling); Paradise, Cochise Co., ♂ (June, O. C. Poling); Pinal Co., "3 miles west of Magna," ♂ (Aug. 18, 1924, E. P. Van Duzee); San Bernardino Ranch, Douglas, Cochise Co., ♂ (Aug., elevation 3750 feet, F. H. Snow); "Southern Arizona," ♂, ♀ (date and collector unknown); Superior, Pinal Co., 6 ♂♂ (Boyce Thompson Arboretum, Aug. 1–2, 1937, A. B. Klots); Tucson, Pima Co., 3 ♂♂ (St. Xavier National Monument, Aug. 12, 1924, J. O. Martin).

The following series of 29 ♀♀ has been tentatively associated with *macrophallus*. I had originally placed them with the ♀♀ of the allied species, *variabilis*, which they closely resemble. In addition, the data labels are identical for numerous ♀♀ of both species. However, the ♀♀ listed below differ somewhat from those of *variabilis* and they seem more likely to belong to *macrophallus*, despite the fact that none of the data labels are identical between the two sexes in the resulting series representing *macrophallus*. The ♀♀ far outnumber the ♂♂, an unusual situation among acrolophids. For these reasons the association is rather questionable and the 29 ♀♀ are not to be considered paratypes. The sources of these specimens are: American Museum of Natural History (7 ♀♀); California Academy of Sciences (14 ♀♀); Carnegie Museum (3 ♀♀); Cornell University (1 ♀); New Mexico College of Agriculture and Mechanic Arts (1 ♀); University of Kansas (3 ♀♀).

ARIZONA: Baboquivari Mountains, 4 ♀♀ (no date, one specimen with mite on abdomen, F. H. Snow); Huachuca Mountains, ♀ (Ramsay Canyon, July 10–15, 1941, A. B. Klots); Oracle, Pinal Co., 4 ♀♀ (July 28, 1924, J. O. Martin), 9 ♀♀ ("14 miles east of Oracle," July 24 and 27, 1924, one specimen with mite on abdomen, E. P. Van Duzee and J. O. Martin); Palmerlee, Cochise Co., ♀ (date and collector unknown); Pinal Co., "6 miles south of Florence," ♀ (July 23, 1924, E. P. Van Duzee); San Bernardino Ranch, Cochise Co., ♀ (Aug., elevation 3750 feet, F. H. Snow); Tucson, 2 ♀♀ (July 30, 1937, A. B. Klots), ♀ (Oct. 8–10, 1939, Crandall), 4 ♀♀ (July 13–14 and 30, 1943, Fred H. Rindge collection). NEW MEXICO: State College, Dona Ana Co., ♀ (July 8, 1945).

Remarks.—This species has been recorded almost exclusively from southern Arizona. It undoubtedly ranges southward into Mexico. *A. macrophallus* is closely related to *variabilis*, *seculatus*, and *vauriei*, forming with them a distinct species group. The members of this group are bound together by similarities of cephalic structures, general habitus, and genital structures. The group has been characterized in the key and in the foregoing remarks on *variabilis*.

A. macrophallus may be easily separated from its close relatives, as well as from the other acrolophids treated here, on the basis of its genitalia. As in *variabilis*, its entire genital capsule is markedly elongate. The aedeagus of *macrophallus* is extremely elongate. In dried specimens, this organ is invariably extruded from the tip of the abdomen, while its basal extremity commonly extends as far back into the moth as the second abdominal segment. The vesica of the aedeagus is armed at or near its apex with a large cornutus. The genital characters are consistent throughout my series of specimens representing *macrophallus*. The name is descriptive of the extremely elongate aedeagus exhibited by this species.

48. *Acrolophus vauriei*, new species

Figures 217–219

Male.—Somewhat similar to *variabilis* in general habitus. Head white sprinkled with fuscous. Labial palpi of intermediate length, fuscous contrastingly suffused with white, erect, extending considerably above head, basal extremities appressed to head and to each other, major portions well separated from head and from each other, each segment heavily clothed with scales developing into prominent tuft along anterior margin, segmentation clearly visible despite vestiture. Eyes large, protruding, naked or with several minute setae, without lashes. Antennae simple, laminate, ochreous, covered dorsad with brown and fuscous scales, segmental processes set closely together throughout antennae. Thorax white suffused with fuscous. Forewings fuscous heavily suffused with contrasting grayish white, pattern somewhat variable; markings in form of alternating light and dark bars along fringe and apical half of costa, dark patch at outer end of cell bordered on either side by grayish-white area, and dark patch beneath center of fold bordered by grayish-white area extending from fold to posterior margin. Hindwings brown, fringes contrastingly grayish-white streaked with brown. Abdomen dull brown. Wing expanse: 19 to 21 mm.

Female.—Coloration similar to that of ♂, but pattern less contrasting. Labial palpi slightly shorter than in ♂, porrect, rather closely appressed to each other, heavily clothed with scales, segmenta-

tion partially obscured by vestiture. Eyes essentially same as those of ♂. Antennae simple, slender, segments largely covered by scales. Wing expanse: 21 mm.

MALE GENITALIA.—Vinculum typical, as in other species.

Tegumen with lateral arm glabrous, of medium width, rather elongate, narrowing somewhat to point of articulation with vinculum; dorsal area glabrous, of medium width, indistinctly fusing with base of uncus.

Harpe simple. Lateral aspect: sublinear, quite similar to that of *seculatus*. Costa and sacculus fused, comprising somewhat more than basal half of harpe, glabrous except for punctate and setose ventrocaudal margin of sacculus, apical half evenly expanded ventrad, basal half slender and sinuate; ental area from base to near apex produced dorsad in form of smoothly rounded, weakly sclerotized expansion extending well beyond base of arm of transtilla. Cucullus indistinctly fused with costa and sacculus, elongate, slender, very heavily punctate ectad and entad, sparsely setose in basal and apical areas, basal two-thirds with margins sublinear and subparallel, apical third somewhat expanded dorsad; apex with ventral margin broadly and evenly rounded, dorsal margin produced slightly distad and very narrowly rounded.

Transtilla with arm glabrous, well sclerotized, approximately one-fourth as long as harpe, linear except for extreme apex curving ventrad and ectad, subparallel with costal margin, terminating subacutely somewhat above base of harpe.

Uncus simple. Dorsal aspect: base fused with tegumen and set off only by heavily punctate lateral and mesal areas in basal half; lateral margins heavily sclerotized, punctate and setose, sublinear, evenly converging into uncal process. Uncal process distinct from basal area by its greater degree of sclerotization, lateral margins sparsely punctate and setose at base, length and width medium, evenly curving caudoventrad, apex subacute.

Gnathos fused, broad, of medium length, glabrous, curving ventrocaudad, ventral surface slightly concave and lateral margins directed strongly downward to give hood-shaped appearance; apical portion thin, somewhat upcurved, subtriangular, apex narrowly rounded.

Anellus membranous, unarmed, juxta absent.

Aedeagus slender, elongate, approximately as long as harpe, cylindrical, asymmetrical, glabrous, sublinear and somewhat sinuate in dorsal and ventral aspects, basal and apical thirds curving somewhat ventrad in lateral aspect, base slightly expanded dorsad, approximate apical third opening dorsad; apex terminating ventrad in short, robust, heavily sclerotized, acute, spinelike process; apex terminating

dorsad in several elongate, slender, weakly sclerotized areas blending with membrane of vesica.

Vesica membranous, elongate, slender, armed at apex with two cornuti. A third extremely minute cornutus may occur ventrad between the two larger ones. These cornuti are rather indistinctly associated with the weakly sclerotized dorsal areas of the apex of the aedeagus, and thus might be considered as armature of the latter. However, they are fairly flexible and seem to be more closely associated with the vesica. Cornuti: one located at extreme apex of vesica, other with apex just reaching base of first cornutus; small, approximately equal in size, well sclerotized, acute, directed distad.

Type.—Holotype ♂ in the American Museum of Natural History at New York City.

Paratypes (2 ♂♂, 1 ♀).—American Museum of Natural History (1 ♂, 1 ♀); U.S. National Museum (1 ♂).

Type locality.—Terlingua, Brewster Co., Tex. (July 3, 1948, C. & P. Vaurie).

Distribution.—Southwestern United States. Southwestern Texas.

Specimens examined.—4 (3 ♂♂, 1 ♀), from 2 localities:

Texas: Fort Davis, Jeff Davis Co., ♂, ♀ (July 2, 1948 C. and P. Vaurie); Terlingua, Brewster Co., 2 ♂♂ (July 3, 1948, C. and P. Vaurie).

Remarks.—This species undoubtedly ranges southward into Mexico. It is apparently quite rare in collections. *A. vauriei* is closely related to *variabilis*, *seculatus*, and *macrophallus*, forming with them a distinct species group. This group has been characterized in the key and in the foregoing remarks on *variabilis*.

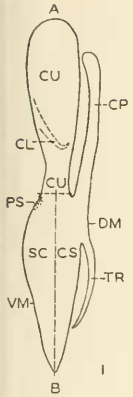
A. vauriei may be separated from its close relatives, as well as from the other species treated here, on the basis of its genital structure. Its aedeagus is not greatly elongated and it does not tend to extrude from dried specimens. The vesica of this organ is armed at its apex with two or three small cornuti.

This species is named in honor of its collectors, Charles and Patricia Vaurie.

FIGURES 1–24.—1–4, Hypothetical male genital structures in *Acrolophus:* 1, right harpe and associated structures, lateral ectal aspect; 2, aedeagus and associated structures, ventral aspect; 3, tegumen and associated structures, dorsolateral aspect; 4, bifurcate uncus and paired gnathos, dorsolateral aspect. 5–24, *Acrolophus popeanellus* (Clemens): 5, 6, entire male genital capsule: 5, ventral aspect; 6, dorsal aspect. 7, Male abdomen with genitalia extruded, lateral aspect. 8, Extruded male genitalia, lateral aspect. 9, Male genitalia with vinculum and right harpe removed, lateral aspect. 10, Aedeagus, vesica, and clusters of cornuti, ventral aspect. 11, Aedeagus, vesica, and clusters of cornuti, dorsal aspect. 12, aedeagus, vesica, and cornuti, ventral aspect. 13, Apical portion of vesica with apical cluster of cornuti. 14, Basal portion of vesica with basal cluster of cornuti. 15, Apical half of vesica with series of cornuti visible beneath apical extension of aedeagus, dorsal aspect. 16–19, uncus: 16, lateral aspect of specimen 1; 17, lateral aspect of specimen 2; 18, dorsal aspect of specimen 1; 19, outline, dorsal aspect of specimen 2. 20, 21, Right harpe and arm of transtilla: 20, lateral ental aspect of specimen 1; 21, lateral ectal aspect of specimen 1. 22, 23, Left harpe and arm of transtilla: 22, lateral ectal aspect of specimen 2; 23, lateral ental aspect of specimen 2; 24, right harpe and arm of transtilla, lateral ectal aspect of specimen 3.

ABBREVIATIONS APPLIED TO THE MALE GENITALIA

A—apex.
AD—aedeagus.
AN—anellus.
B—base.
CL—clasper (on ental surface) of cucullus.
CN—cornutus (cornuti).
CP—dorsal process of costa=costal process or dorsal process.
CS—costa of harpe.
CU—cucullus of harpe.
DM—dorsal margin.
GN—gnathos.
HP—harpe.
JX—juxta.
LAGN—lateral arm of gnathos.
LATG—lateral arm of tegumen.
MA—manica, uniting anellus and aedeagus.
PN—penis.
PS—punctate, setose area near ventrocaudal extremity of sacculus.
SC—sacculus of harpe.
TG—tegumen.
TR—arm of transtilla.
UF—furcae of uncus.
UN—uncus.
UP—uncal process.
VM—ventral margin.
VN—vinculum.
VS—vesica.



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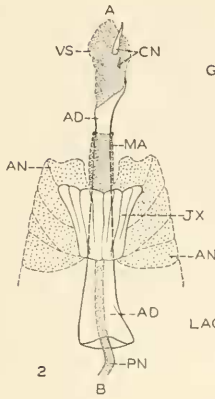

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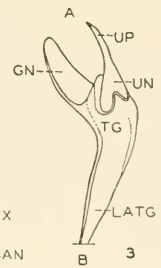

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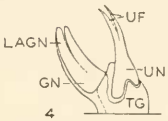

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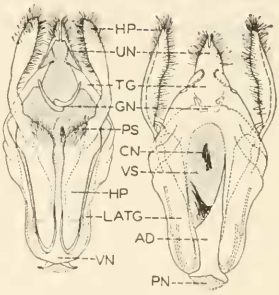

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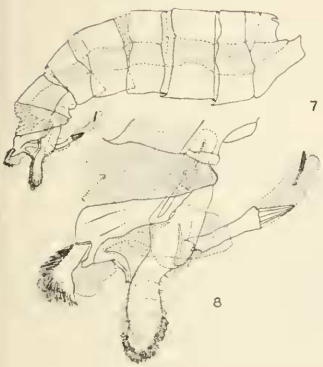

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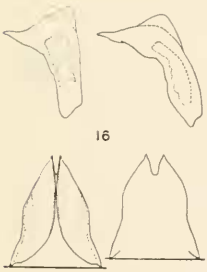

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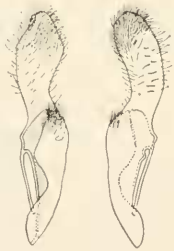

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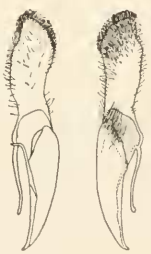

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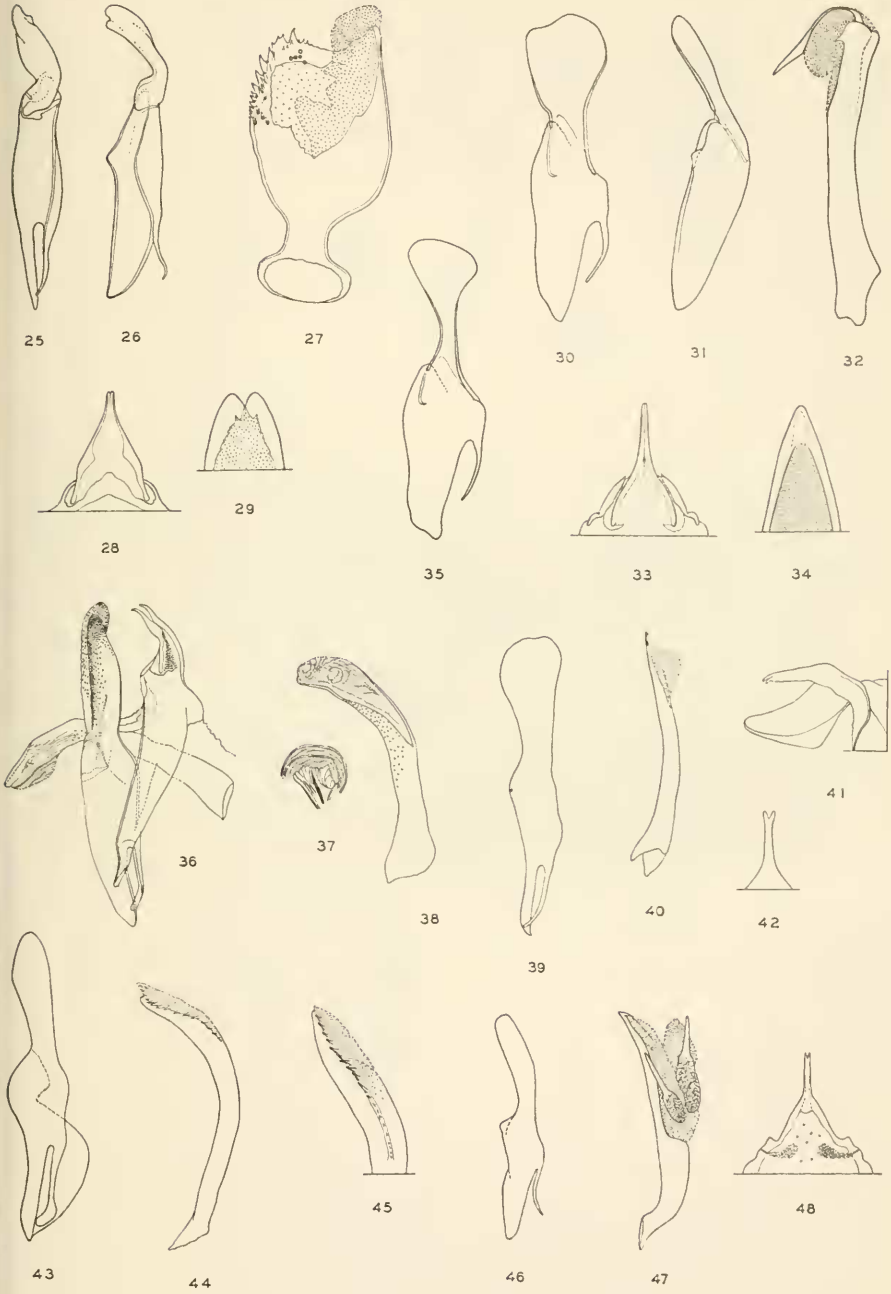
For Explanation See Opposite Page.

FIGURES 25–48.—25–29, *Acrolophus dorsimaculus* (Dyar): 25, right harpe and arm of transtilla, lateral ectal aspect; 26, left harpe and arm of transtilla, dorsal aspect; 27, aedeagus and vesica, dorsal aspect; 28, uncus, dorsal aspect; 29, apical portion of gnathos, dorsal aspect. 30–34, *Acrolophus griseus griseus* (Walsingham), new combination: 30, right harpe and arm of transtilla, lateral ectal aspect; 31, right harpe, ventral aspect; 32, aedeagus and vesica, right lateral aspect; 33, uncus, dorsal aspect; 34, central and apical portions of gnathos, dorsal aspect. 35, *Acrolophus griseus capitatus*, new subspecies, right harpe and arm of transtilla, lateral ectal aspect. 36–38, *Acrolophus texanellus* (Chambers): 36, male genitalia with vinculum and anellus removed, right lateral aspect; 37, dorsal portion of anellus, lateroventral aspect; 38, aedeagus and vesica, right lateral aspect. 39–42, *Acrolophus acornus*, new species: 39, right harpe and arm of transtilla, lateral ectal aspect; 40, aedeagus and vesica, right lateral aspect; 41, uncus and gnathos, dorsolateral aspect; 42, apical portion of uncus, dorsal aspect. 43–45, *Acrolophus simulatus* Walsingham: 43, right harpe and arm of transtilla, lateral ectal aspect; 44, aedeagus, vesica, and cornuti, right lateral aspect; 45, apical portion of aedeagus with vesica and cornuti, dorsolateral aspect. 46–48, *Acrolophus bicornutus*, new species: 46, right harpe and arm of transtilla, lateral ectal aspect; 47, aedeagus, vesica, and cornuti, right lateral aspect; 48, uncus, dorsal aspect.



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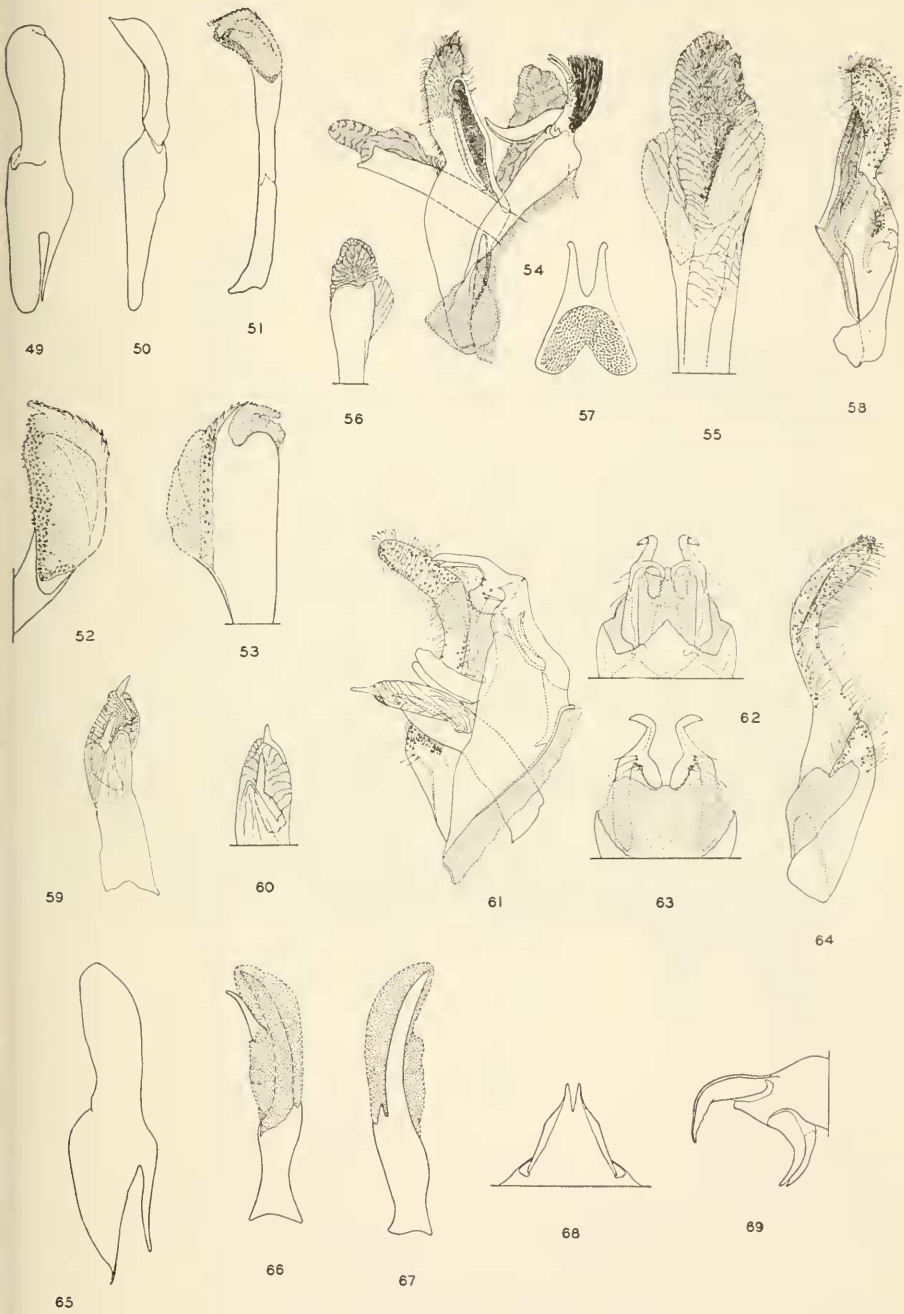
FIGURES 49–69.—49–53, *Acrolophus filicicornis* (Walsingham): 49, right harpe and arm of transtilla, lateral ectal aspect; 50, right harpe, ventral aspect; 51, aedeagus, vesica, and cornuti, right lateral aspect; 52, vesica and cornuti, right lateral aspect; 53, apical portion of aedeagus showing dorsal aspect of terminal process, spines, and adjacent vesica. 54–58, *Acrolophus plumifrontellus* (Clemens): 54, male genitalia (base of aedeagus not shown), right lateral aspect; 55, apical half of aedeagus with vesica and cornuti, dorsal aspect; 56, apical half of aedeagus with vesica, ventral aspect; 57, uncus, ventral aspect; 58, right harpe and arm of transtilla, lateral ental aspect. 59–64, *Acrolophus mortipennellus* (Grote): 59, aedeagus, vesica, and cornuti, lateroventral aspect; 60, apical portion of aedeagus with vesica and cornuti, ventral aspect; 61, male genitalia, right lateral aspect, with vinculum, right harpe, transtilla, and anellus removed; 62, uncus, dorsal aspect; 63, uncus, ventral aspect; 64, right harpe, lateral ental aspect. 65–69, *Acrolophus klotsi*, new species: 65, right harpe and arm of transtilla, lateral ectal aspect; 66, aedeagus, vesica, and cornutus, right lateral aspect; 67, aedeagus and vesica, left lateral aspect; 68, uncus, dorsal aspect; 69, uncus and gnathos, lateral aspect.



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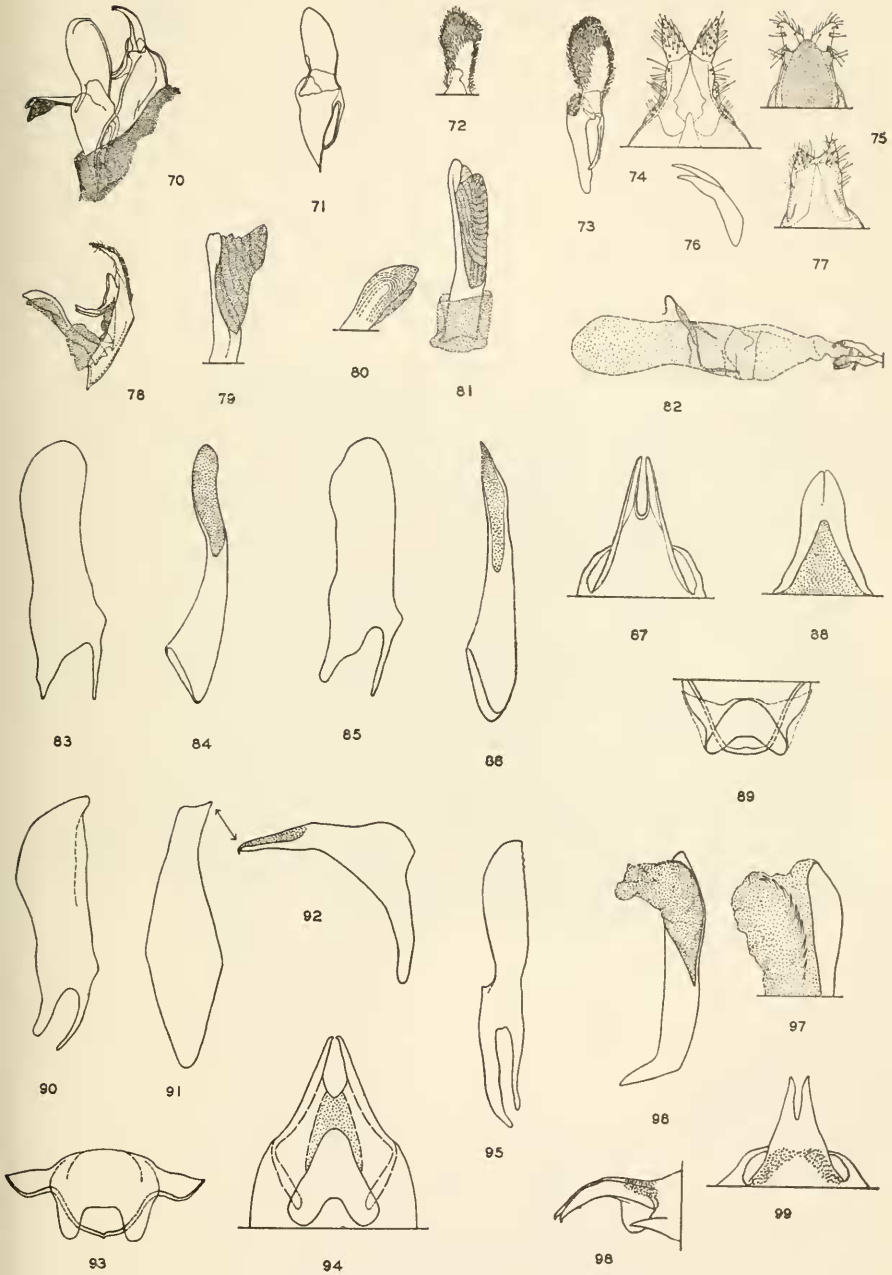
FIGURES 70–99.—70–82, *Acrolophus propinquus* (Walsingham): 70, male genitalia, right lateral aspect of specimen 1; 71, right harpe and arm of transtilla, lateral ectal aspect of specimen 2; 72, cucullus of right harpe, lateral ectal aspect of specimen 3; 73, right harpe and arm of transtilla, lateral ectal aspect of specimen 4; 74, uncus, dorsal aspect; 75, uncus, ventral aspect; 76, outline of uncus, dorsolateral aspect; 77, asymmetrically bifurcate uncus, dorsal aspect; 78, male genitalia with vinculum, harpes, and transtilla removed, right lateral aspect of specimen 2; 79, apical portion of aedeagus with extruded vesica, ventral aspect; 80, apical portions of aedeagus and vesica, left lateral aspect; 81, anellus, aedeagus, and vesica, ventral aspect; 82, membranous sac, apparently the sealed hind-intestine, extruded through the anus. 83, 84, *Acrolophus macrogaster unipectinicornus*, new subspecies: 83, right harpe and arm of transtilla, lateral ectal aspect; 84, aedeagus and vesica, right lateral aspect. 85–89, *Acrolophus macrogaster laminicornus*, new subspecies: 85, right harpe and arm of transtilla, lateral ectal aspect; 86, aedeagus and vesica, right lateral aspect; 87, uncus, dorsal aspect; 88, gnathos, dorsocephalic aspect; 89, vinculum, ventral aspect. 90–94, *Acrolophus balduf*, new species: 90, right harpe and arm of transtilla, lateral ectal aspect; 91, aedeagus, ventral aspect; 92, aedeagus and vesica, right lateral aspect; 93, vinculum, ventral aspect; 94, fused gnathos and bifurcate uncus, ventral aspect. 95–99, *Acrolophus arizonellus* Walsingham: 95, right harpe and arm of transtilla, lateral ectal aspect; 96, aedeagus, vesica, and cornuti, right lateral aspect; 97, apical portions of aedeagus and vesica showing cornuti, dorsolateral aspect; 98, uncus, lateral aspect; 99, uncus, dorsal aspect.



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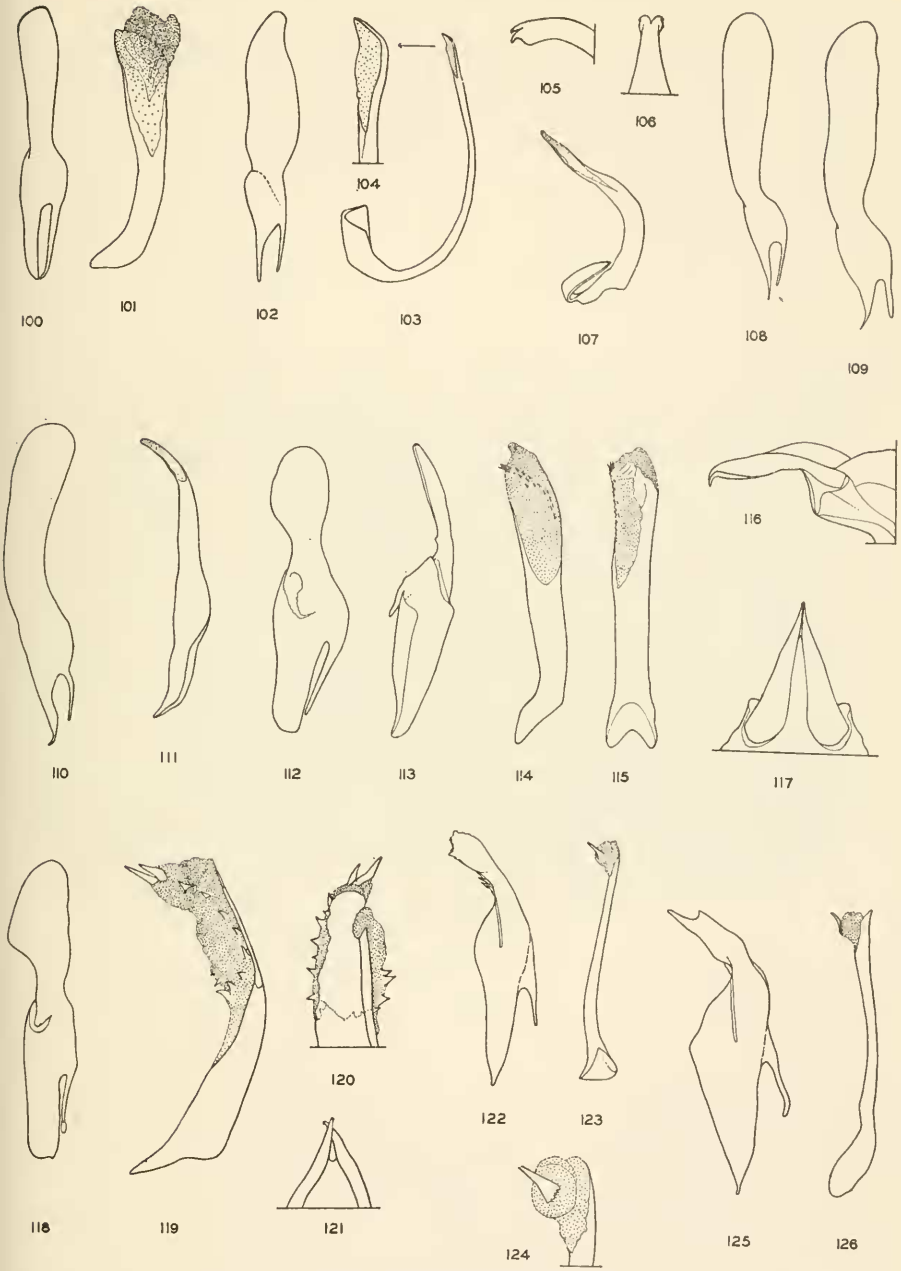
FIGURES 100-126.—100, 101, *Acrolophus luriei*, new species: 100, right harpe and arm of transtilla, lateral ectal aspect; 101, aedeagus and vesica, right lateral aspect. 102-106, *Acrolophus maculifer* (Walsingham): 102, right harpe and arm of transtilla, lateral ectal aspect; 103, aedeagus and vesica, right lateral aspect; 104, apical portion of aedeagus with vesica, right lateral aspect; 105, apical portion of uncus, dorsolateral aspect; 106, apical portion of uncus, dorsal aspect. 107-109, *Acrolophus cressoni* (Walsingham): 107, aedeagus and vesica, right lateral aspect; 108, right harpe and arm of transtilla, lateral ectal aspect, Texas specimen; 109, right harpe and arm of transtilla, lateral ectal aspect, Florida specimen. 110, 111, *Acrolophus crescentellus* (Kearfott): 110, right harpe and arm of transtilla, lateral ectal aspect; 111, aedeagus and vesica, right lateral aspect. 112-117, *Acrolophus piger* (Dyar): 112, right harpe and arm of transtilla, lateral ectal aspect; 113, right harpe, ventral aspect; 114, aedeagus, vesica, and cornuti, right lateral aspect; 115, aedeagus, vesica, and cornuti, dorsal aspect; 116, uncus, lateral aspect; 117, uncus, dorsal aspect. 118-121, *Acrolophus vanduzeei*, new species: 118, right harpe and arm of transtilla, lateral ectal aspect; 119, aedeagus, vesica, and cornuti, right lateral aspect; 120, apical half of aedeagus with vesica and cornuti, dorsal aspect; 121, apical portion of uncus, dorsal aspect. 122-124, *Acrolophus pseudohirsutus*, new name: 122, right harpe and arm of transtilla, lateral ectal aspect; 123, aedeagus, vesica, and cornutus, right lateral aspect; 124, apical portion of aedeagus with vesica and cornutus, right lateral aspect. 125, 126, *Acrolophus kearfotti* (Dyar): 125, right harpe and arm of transtilla, lateral ectal aspect; 126, aedeagus, vesica, and cornutus, right lateral aspect.



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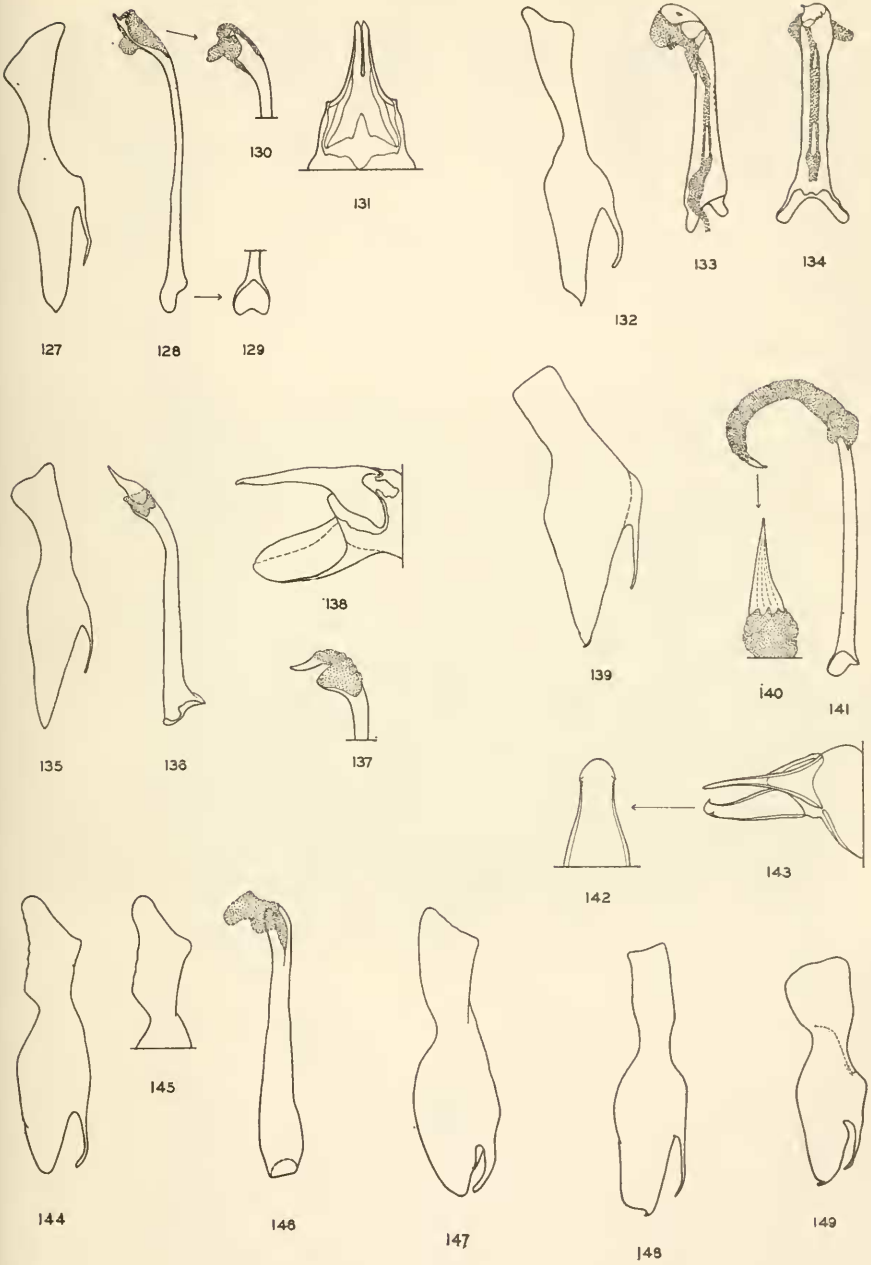
FIGURES 127-149.—127-131, *Acrolophus furcatus* (Walsingham): 127, right harpe and arm of transtilla, lateral ectal aspect; 128, aedeagus and vesica, right lateral aspect; 129, basal portion of aedeagus, dorsal aspect; 130, apical portion of aedeagus with vesica, ventral aspect; 131, uncus, dorsal aspect. 132-134, *Acrolophus punctellus* (Busck): 132, right harpe and arm of transtilla, lateral ectal aspect; 133, aedeagus, vesica, and cornuti, right lateral aspect; 134, aedeagus, vesica, and cornuti, dorsal aspect. 135-138, *Acrolophus pyramellus* (Barnes & McDunnough): 135, right harpe and arm of transtilla, lateral ectal aspect; 136, aedeagus, vesica, and cornutus, right lateral aspect; 137, apical portion of aedeagus with vesica and cornutus, right lateral aspect; 138, uncus and gnathos, dorsolateral aspect. 139-143, *Acrolophus cockerelli* (Dyar): 139, right harpe and arm of transtilla, lateral ectal aspect; 140, apical portion of vesica with cornutus; 141, aedeagus, vesica, and cornutus, right lateral aspect; 142, central and apical portions of gnathos, dorsal aspect; 143, uncus and gnathos, dorsolateral aspect. 144-146, *Acrolophus laticapitanus occidens* Busck, new combination: 144, right harpe and arm of transtilla, lateral ectal aspect of specimen 1; 145, cucullus of right harpe, lateral ectal aspect of specimen 2; 146, aedeagus and vesica, dorsolateral aspect. 147, *Acrolophus laticapitanus occidens* form *leopardus* Busck, new combination, right harpe and arm of transtilla, lateral ectal aspect. 148, *Acrolophus laticapitanus heinrichi*, new subspecies, right harpe and arm of transtilla, lateral ectal aspect. 149, *Acrolophus laticapitanus clarkei*, new subspecies, right harpe and arm of transtilla, lateral ectal aspect.



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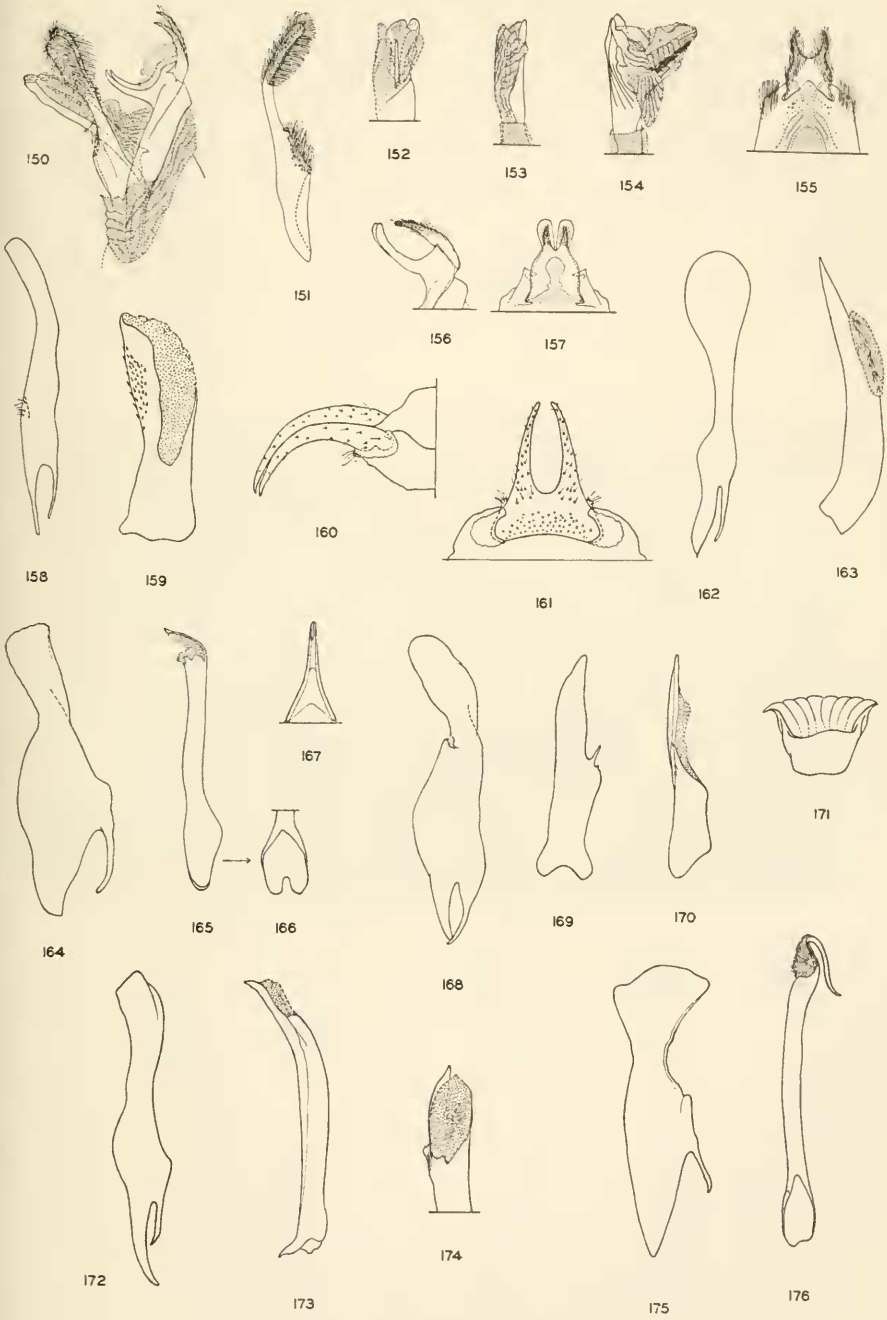
FIGURES 150-176.—150-157, *Acrolophus arcanellus* (Clemens): 150, male genitalia, right lateral aspect of specimen 1; 151, left harpe, ventral aspect; 152, apical portion of aedeagus with vesica and cornutus, dorsal aspect of specimen 1; 153, apical portions of anellus, aedeagus, and vesica, left lateral aspect of specimen 1; 154, apical portions of anellus and aedeagus showing extruded vesica and cornutus, dorsolateral aspect of specimen 2; 155, dorsocaudal portion of tegumen with uncus, dorsal aspect of specimen 1; 156, uncus and gnathos, lateral aspect of specimen 2; 157, uncus and gnathos, dorsal aspect of specimen 2. 158-161, *Acrolophus morus* (Grote): 158, right harpe and arm of transtilla, lateral ectal aspect; 159, aedeagus and vesica, right lateral aspect; 160, uncus, dorsolateral aspect; 161, uncus, dorsal aspect. 162, 163, *Acrolophus forbesi*, new species: 162, right harpe and arm of transtilla, lateral ectal aspect; 163, aedeagus, vesica, and cornuti, right lateral aspect. 164-167, *Acrolophus panamae* Busck: 164, right harpe and arm of transtilla, lateral ectal aspect; 165, aedeagus and vesica, right lateral aspect; 166, basal portion of aedeagus, dorsal aspect; 167, uncus, dorsal aspect. 168-171, *Acrolophus juxtatus*, new species: 168, right harpe and arm of transtilla, lateral ectal aspect; 169, aedeagus, ventral aspect; 170, aedeagus and vesica, right lateral aspect; 171, juxta, ventral aspect. 172-174, *Acrolophus chiricahuae*, new species: 172, right harpe and arm of transtilla, lateral ectal aspect; 173, aedeagus and vesica, right lateral aspect; 174, apical portion of aedeagus with vesica, dorsal aspect. 175, 176, *Acrolophus fervidus* Busck: 175, right harpe and arm of transtilla, lateral ectal aspect; 176, aedeagus and vesica, dorsal aspect.



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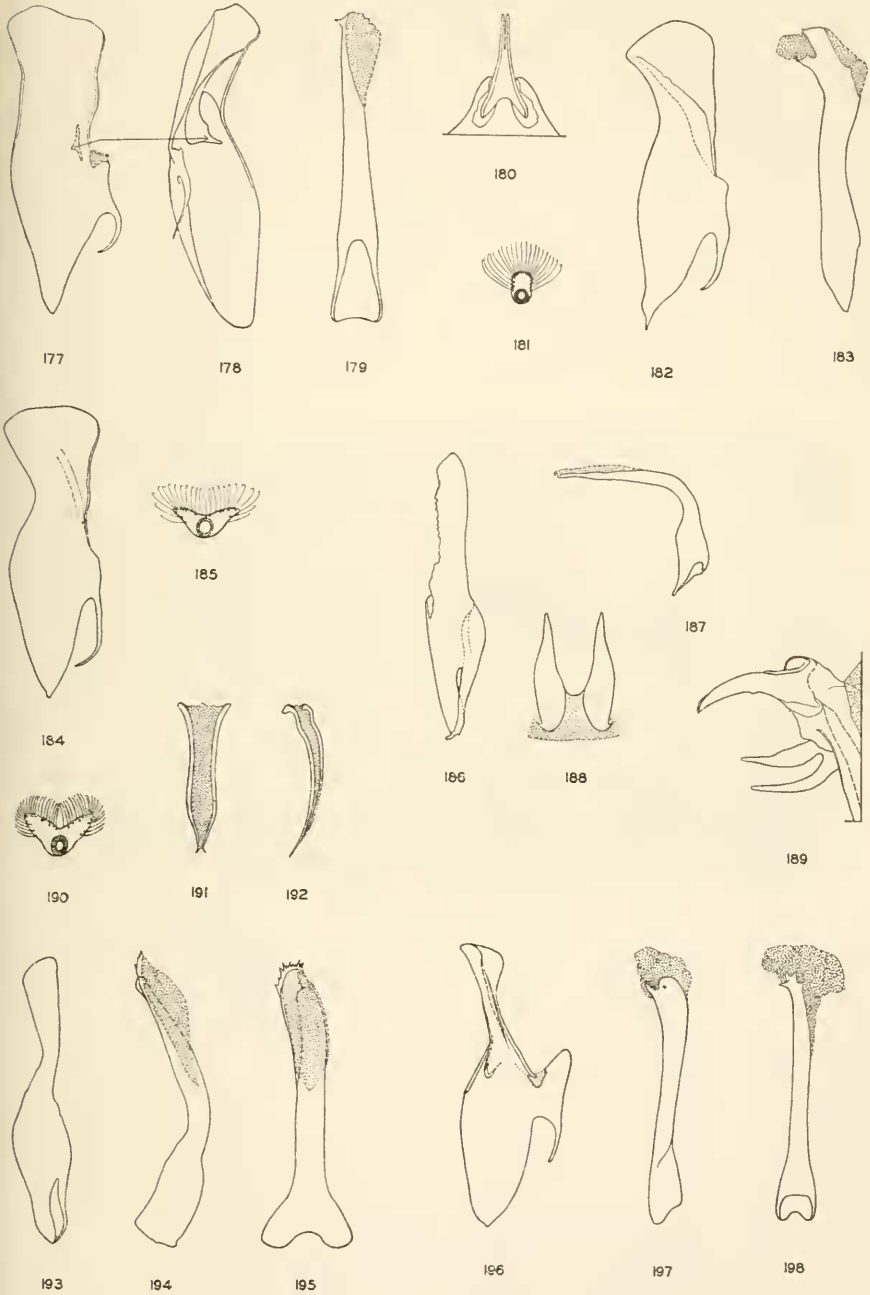
FIGURES 177–198.—177–180, *Acrolophus persimplex* (Dyar): 177, right harpe and arm of transtilla, lateral ectal aspect; 178, right harpe showing clasper of cucullus and arm of transtilla, dorsal aspect; 179, aedeagus and vesica, dorsal aspect; 180, dorsocaudal portion of tegumen with uncus, dorsal aspect. 181–183, *Acrolophus sinclairi sinclairi*, new subspecies: 181, transverse section of single segment of unipectinate antenna, antennal shaft below, segmental process above; 182, right harpe and arm of transtilla, lateral ectal aspect; 183, aedeagus and vesica, right lateral aspect. 184–185, *Acrolophus sinclairi nelsoni*, new subspecies: 184, right harpe and arm of transtilla, lateral ectal aspect; 185, transverse section of single segment of reduced bipectinate antenna, antennal shaft below, segmental process above. 186–189, *Acrolophus quadrellus* (Barnes & McDunnough): 186, right harpe and arm of transtilla, lateral ectal aspect; 187, aedeagus and vesica, right lateral aspect; 188, arms of gnathos, dorsal aspect; 189, uncus and gnathos, dorsolateral aspect. 190–195, *Acrolophus minor* (Dyar): 190, transverse section of single segment of reduced bipectinate antenna, antennal shaft below, segmental process above; 191, juxta, ventral aspect; 192, juxta, dorsolateral aspect; 193, right harpe and arm of transtilla, lateral ectal aspect; 194, aedeagus and vesica, right lateral aspect; 195, aedeagus and vesica, dorsal aspect. 196–198, *Acrolophus parvipalpus*, new species: 196, right harpe showing costal process and arm of transtilla, lateral ectal aspect; 197, aedeagus and vesica, right lateral aspect; 198, aedeagus and vesica, dorsal aspect.



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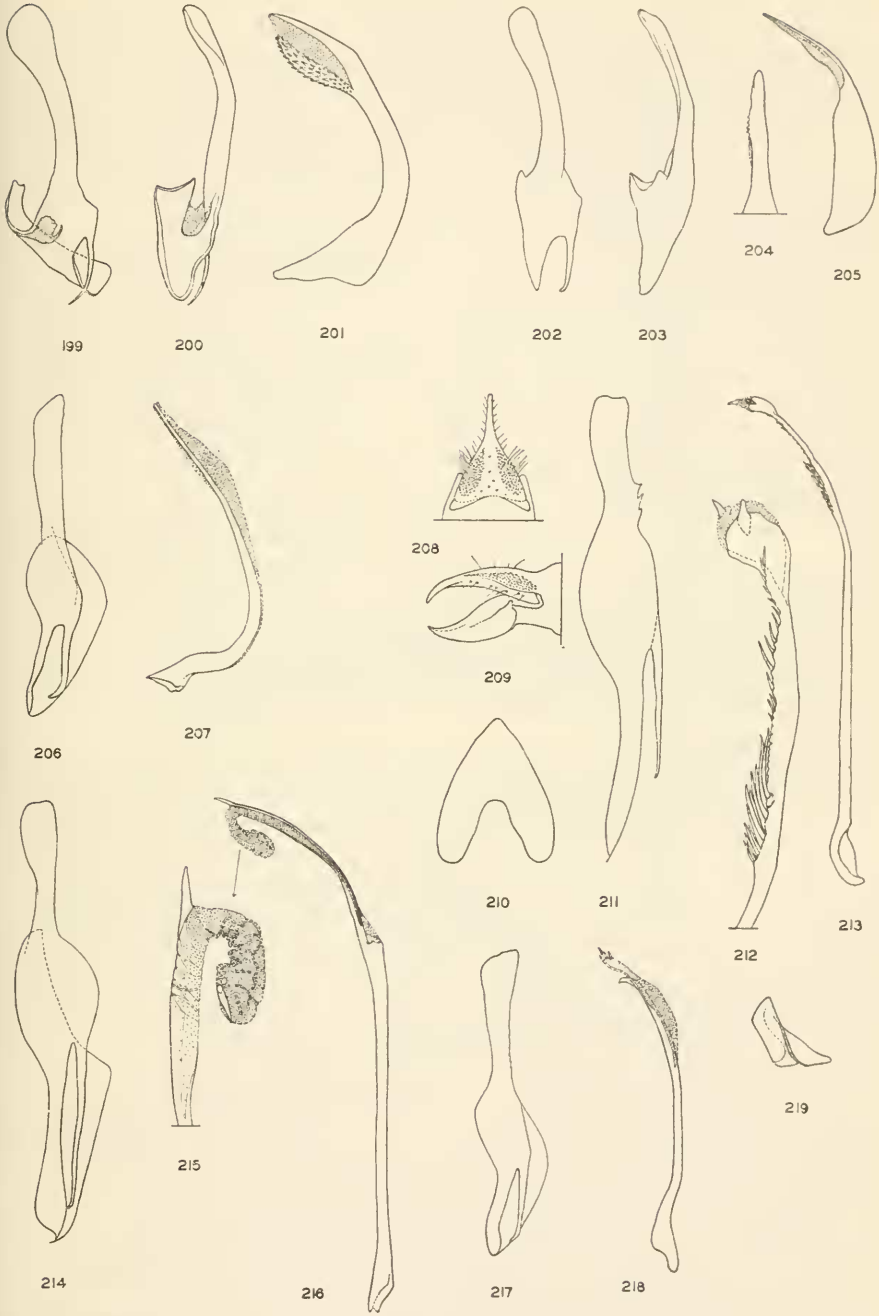
FIGURES 199–219.—199–201, *Acrolophus davisellus* Beutenmüller: 199, right harpe and arm of transtilla, lateral ectal aspect; 200, right harpe and arm of transtilla, ventral aspect; 201, aedeagus and vesica, right lateral aspect. 202–205, *Acrolophus serratus*, new species: 202, right harpe and arm of transtilla, lateral ectal aspect; 203, right harpe, ventral aspect; 204, approximate apical half of aedeagus, dorsal aspect; 205, aedeagus and vesica, right lateral aspect. 206, 207, *Acrolophus seculatus*, new species: 206, right harpe and arm of transtilla, lateral ectal aspect; 207, aedeagus and vesica, right lateral aspect. 208–213, *Acrolophus variabilis* (Walsingham): 208, uncus, dorsal aspect; 209, uncus and gnathos, lateral aspect; 210, gnathos, ventral aspect, fused apex above; 211, right harpe and arm of transtilla, lateral ectal aspect; 212, approximate apical third of aedeagus, dorsolateral aspect, showing armature, vesica, and cornutus; 213, aedeagus, vesica, and cornutus, dorsolateral aspect. 214–216, *Acrolophus macrophallus*, new species: 214, right harpe and arm of transtilla, lateral ectal aspect; 215, apical portions of aedeagus and vesica showing cornutus, left lateral aspect; 216, aedeagus and vesica, right lateral aspect. 217–219, *Acrolophus vauriei*, new species: 217, right harpe and arm of transtilla, lateral ectal aspect; 218, aedeagus, vesica, and cornuti, right lateral aspect; 219, fused gnathos, lateroventral aspect, ventral surface at left, apex above.



For Explanation See Opposite Page.

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Busck, August

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1912a. Microlepidoptera from Laguna Beach, Southern California. First Ann. Rept. Laguna Marine Lab., Pomona Coll., vol. 1, pp. 168–169 (May). (Description of *flavicomus*. First appearance in print of Acrolophidae as a family name.)

1912b. Two new Californian Acrolophidae. Proc. Ent. Soc. Washington, vol. 14, no. 3 (July–Sept.), p. 184 (actual date of issue: Sept. 30, 1912). (Descriptions of *diversus* and *hirsutus*.)

Busck, August—Continued

1913. New Mexican Acrolophidae. Proc. Ent. Soc. Washington, vol. 14, no. 4 (Oct.–Dec.), pp. 222–223, 1912 (actual date of issue: Jan. 10, 1913). (Description of *fervidus*.)

1914a. New genera and species of Microlepidoptera from Panama. Proc. U.S. Nat. Mus., vol. 47, p. 66 (April). (Description of *panamae*.)

1914b. On the classification of the Microlepidoptera. Proc. Ent. Soc. Washington, vol. 16, no. 2, pp. 46–54, pl. 2. (Deals largely with taxonomic importance of wing venation and history of its use in Microlepidoptera. Origin of term, Microlepidoptera, is given and it is here considered a natural group. Family Acrolophidae mentioned several times but no mention is made of genitalia.)

1931. On the female genitalia of the Microlepidoptera and their importance in the classification and determination of these moths. Bull. Brooklyn Ent. Soc., vol. 26, no. 5, pp. 199–216, pls. 9–13. (Mostly on ♀ genitalia with no specific mention of Acrolophidae. Cited for interesting account of copulation and, on p. 206, explanation of "deciduous cornuti" of the ♂♂. Very well illustrated with 20 figures and ample bibliography lists 15 authors and 20 titles. An excellent starting point for systematic work with ♀ genitalia of Microlepidoptera.)

Busck, August, and Heinrich, Carl

1921. On the male genitalia of the Microlepidoptera and their systematic importance. Proc. Ent. Soc. Washington, vol. 23, no. 6, pp. 145–152, pls. 12, 13. (The concept of morphology and the system of terminology, as here applied to the ♂ genitalia of Microlepidoptera, have been largely adopted in the foregoing revision of the Acrolophidae.)

Chambers, V. T.

1878a. Descriptions of new Tineina from Texas, and others from more northern localities. Bull. U.S. Geol. & Geogr. Surv. Terr., vol. 4, no. 1, art. 3, p. 79 (Feb.). (Description of *texanella*.)

1878b. Index to the described Tineina of the United States and Canada. Bull. U.S. Geol. & Geogr. Surv. Terr., vol. 4, no. 1, art. 5, pp. 128–129. (Questions validity of Zeller's *scardina*.)

Clarke, J. F. G.

1941. The preparation of slides of the genitalia of Lepidoptera. Bull. Brooklyn Ent. Soc., vol. 36, no. 4, pp. 149–161, figs. 1–24, pls. 1–5. (Techniques used for Acrolophidae have been partially drawn from those advocated by Clarke.)

Clemens, J. B.

1859. Contributions to American lepidopterology. Proc. Acad. Nat. Sci. Philadelphia, for 1859, pp. 260–261 (Sept.). ("Printed for the Academy: 1860" on title page of vol. Descriptions of *Anaphora*, *plumifrontella*, *popeanella*, and *arcanella*.)

1872. The Tineina of North America, ed. H. T. Stainton, pp. vii, 39, 56–60, figs. 3, 4. London. ("Being a collected edition of the late Dr. Clemens' writings on that group of insects." Except for two small figures, this book contains practically nothing on *Acrolophus* not already published by Clemens.)

Comstock, J. H.

1924. An introduction to entomology, pp. 582, 589, 611. Ithaca, N.Y.: Comstock Publ. Co. (One of the first text books with diagnosis of family characters of Acrolophidae. Also mentions larval habits. Same information repeated in later editions of 1933, 1936, 1940, and 1947.)

da Costa Lima, A. M.

1945. Insetos do Brasil. Tomo 5°. (capitulo 28), Lepidópteros, 1ª. Parte. Escola Nacional de Agronomia, Série Didática, N.° 7, pp. 210–212, figs. 95–97. Rio de Janeiro. (A general text, apparently in Portuguese, on certain groups of moths. With many illustrations, especially photographs, of ♂ genitalia of Lepidoptera. Section on Acrolophidae includes figure of venation of fore- and hindwings, photograph of ♂ genitalia, photograph of adult, and bibliographical reference to Walsingham, 1887.)

Dyar, H. G.

1895. *Eutheca* (*Sapinella*, Kirby) *mora*, Grote. Can. Ent., vol. 27, no. 1 (Jan.), p. 15. (Dyar publishes a note from Walsingham placing this species in the Anaphorinae, genus *Pseudanaphora*, and close to *arcanella*.)

1900a. Notes on some North American species of Tineidae. Can. Ent., vol. 32, no. 10 (Oct.), pp. 305–311. (Description of *cockerelli*, validation of *quadripunctellus* and *confusellus*, and introduction of *filicornis* into the literature as a misspelling.)

1900b. New species of Anaphorinae. Can. Ent., vol. 32, no. 11 (Nov.), pp. 326–328. (Descriptions of *barnesii*, *persimplex*, *piger*, and *dorsimacula*.)

1903a. A list of North American Lepidoptera and key to the literature of this order of insects. U.S. Nat. Mus. Bull. 52, p. 488, no. 5469, pp. 577–579, nos. 6577–6603, 1902 (actual date of issue: Jan. 13, 1903). (An important catalogue containing bibliographical references to original descriptions, including those of the then known 27 species of Acrolophidae. Prepared with assistance of Fernald, Hulst, and Busck. Contains "description" of *davisellus* subspecies *minor* at no. 6601a.)

1903b. List of Lepidoptera taken at Williams, Arizona, by Messrs. Schwarz and Barber. Proc. Ent. Soc. Washington, vol. 5, p. 232 (Feb.). (Description of *unistrigana*.)

1903c. A new anaphorid, and a note on an old one. Can. Ent., vol. 35, no. 3 (March), p. 76. (Description of *kearfotti*.)

Eyer, J. R.

1924. The comparative morphology of the male genitalia of the primitive Lepidoptera. Ann. Ent. Soc. Amer., vol. 17, no. 3, pp. 275–328, text figs. 1–10, pls. 25–38. (Family Acrolophidae is here diagnosed and taxonomically placed on basis of ♂ genital structure. Genitalia of several North American species figured.)

1926. Characters of family and superfamily significance in the male genitalia of Microlepidoptera. Ann. Ent. Soc. Amer., vol. 19, no. 2, pp. 237–246, pls. 18, 19. (Family Acrolophidae again diagnosed and systematically placed on basis of ♂ genitalia.)

FERNALD, C. H.

1888. A revision of the genera *Acrolophus*, Poey, and *Anaphora*, Clem., by The Right Honorable Lord Walsingham. Ent. Amer., vol. 3, no. 10, pp. 195–196. (A brief review of Walsingham's revision of 1887. Fernald reproduces Walsingham's key to the genera of Anaphorinae. Material in this article is not referenced since it is already covered by the Walsingham references.)

FORBES, S. A.

1890. The burrowing web worm, *Pseudanaphora arcanella*, Clem. In sixteenth report of the state entomologist on the noxious and beneficial insects of Illinois, pp. 98–101, figs. 1–3, 5, pl. 6. (The fifth report of Forbes, covering the years 1887–1888. Larval habits mentioned on p. 98, larva described on p. 99, imago described on p. 100, and imago of *mortipennella* described on p. 101.)

1905. The burrowing web-worms, *Anaphora popeanella* Clem., *Pseudanaphora arcanella* Clem., and *Hypoclopus mortipennellus* Grote. In twenty-third report of the state entomologist on the noxious and beneficial insects of Illinois, pp. 44, 95–98, figs. 24, 76–78. (The twelfth report of Forbes. Discusses appearance and habits of above as larvae, mentioning their injury to young corn.)

FORBES, WILLIAM T. M.

1923. The Lepidoptera of New York and neighboring states (primitive forms: Microlepidoptera, Pyraloids, and Bombyces). Cornell Univ. Agr. Exp. Station Mem. 68, pp. 12, 15, 25, 50, 53, 115–117, 119–122, figs. 19, 87, 91, 93–98. (Diagnoses group as subfamily Acrolophinae and gives characters and keys for larva, pupa, and adult. Keys and discusses 15 eastern species.)

GROTE, A. R.

1872a. Descriptions of two species of *Anaphora*. Can. Ent., vol. 4, no. 7 (July), pp. 136–138. (Descriptions of *mortipennella* and *agrotipennella*.)

1872b. Description of the female of *Anaphora agrotipennella*. Can. Ent., vol. 4, no. 8 (Aug.), pp. 142–143. (Description of ♀ *agrotipennella*.)

1881. North American moths, with a preliminary catalogue of the species of *Hadena* and *Polia*. Bull. U.S. Geol. & Geogr. Surv. Terr., vol. 6, no. 2, art. 10, pp. 257–258 (Sept.). (Descriptions of *Euthcca* and *mora*.)

1886. On the geographical distribution of North American Lepidoptera. Can. Ent., vol. 18, no. 10, p. 199. (Grote states: "In Alabama, aside from the Cotton Moth, it was at certain times hardly possible for me to read at night by light for the swarms of *Acrolophus agrotipennella* and *mortipennella*, which fluttered over the table and the page.")

HAIMBACH, FRANK

1915. New Heterocera (Lep.). Ent. News, vol. 26, no. 7 (July), p. 325, fig. 11, pl. 12. (Description of *busckella*.)

HOLLAND, W. J.

1903. The moth book, a popular guide to a knowledge of the moths of North America, p. 443, figs. 42 and 43, pl. 48. New York: Doubleday, Page & Co. (Color photograph of two species—*arcanellus*, mislabeled as *popeanella*, and *plumifrontellus*.)

KAYE, W. J.

1925. New species and subspecies of Trinidad Rhopalocera and Heterocera. Trans. Ent. Soc. London, 1924–1925, p. 428, fig. 2, pl. 45. (Color reproduction of half specimen of *fervidus*.)

KEARFOTT, W. D.

1907. New Micro-Lepidoptera. Can. Ent., vol. 39, no. 1 (Jan.), p. 9. (Description of *crescentella*.)

KIRBY, W. F.

1892. A synonymic catalogue of Lepidoptera Heterocera (moths), vol. 1, p. 524. Sphinges and Bombyces, London. (New name, *Sapinella* Kirby, replacing preoccupied generic name, *Eutheca* Grote.)

MCDUNNOUGH, J. H.

1939. Check list of the Lepidoptera of Canada and the United States of America. Part II, Microlepidoptera. Mem. Southern California Acad. Sci., vol. 2, no. 1, pp. 103–104, nos. 9540–9585, 9598. (Lists 46 species, 6 synonyms, and 1 form, all under *Acrolophus* in monogeneric family, Acrolophidae. Places family between Psychidae and Tineidae in superfamily Tineoidea.)

MERRICK, H. D.

1901. [No title]. Proc. Ent. Soc. Washington, vol. 5, no. 1, p. 40. (A note on several specimens of *mora* taken at New Brighton, Pa., on Oct. 12, 1901.)

MEYRICK, EDWARD

1913. Descriptions of South American Micro-Lepidoptera. Trans. Ent. Soc. London, 1913, pp. 191–192 (June). (Meyrick here combines all the then known genera of the group in question under *Acrolophus*.)

1919. Exotic Microlepidoptera, vol. 2, no. 9 (Nov.), pp. 279–281. London. (Descriptions of *acanthogona*, *exaphrista*, *carphologa*, and *leucallactis*.)

MURTFELDT, M. E.

1876. Larva of *Anaphora agrotipennella*. Can. Ent., vol. 8, no. 10, pp.185–186. (Description of larva and its habits. Pupa briefly described.)

PIERCE, F. N.

1909. The genitalia of the group Noctuidae of the Lepidoptera of the British Islands: an account of the morphology of the male clasping organs, xii + 88 pp., 32 pls. Liverpool. (Well illustrated pioneer work on morphology and terminology of lepidopterous genitalia. Partially adopted for present revision.)

1914. The genitalia of the group Geometridae of the Lepidoptera of the British Islands: an account of the morphology of the male clasping organs and the corresponding organs of the female, xxix+ 88 pp., 48 pls. Liverpool. (Well illustrated pioneer work on morphology and terminology of lepidopterous genitalia. Partially adopted for present revision.)

POEY, FELIPE

1832. Centurie de Lépidoptères de l'île de Cuba . . ., pp. 51–53, pl. 20 (July). Paris. (Description of *Acrolophus*. Text in French and Latin.)

RILEY, CHARLES VALENTINE

1888. An important contribution to lepidopterology, *in* Insect Life, vol. 1, no. 6, p. 195. U.S. Dept. Agric., Div. of Ent., Periodical Bull. (A brief review of Walsingham's revision of 1887. A tabulation of then known North American genera and species, as recognized by Walsingham, is given. Material in this article is not referenced since it is already covered by the Walsingham references.)

1890. A tineid (*Anaphora popeanella* Clem.) injuring Indian corn. Insect Life, vol. 3, no. 1, pp. 27–28. U.S. Dept. Agric., Div. of Ent., Periodical Bull. (An account of larval habits in form of correspondence between farmer and United States Department of Agriculture.)

SMITH, JOHN BERNHARDT

1891. List of the Lepidoptera of Boreal America, p. 90 (no. 4770), pp. 94–95 (nos. 5043–5066), p. 112. Publ. Amer. Ent. Soc., Philadelphia. (Smith, assisted by Skinner, Hulst, Fernald, and Riley, covered all known Lepidoptera north of Mexico. Lists 24 species, 3 synonyms, and 1 form among 8 genera under family Anaphoridae. Group placed under Tineina between the Choreutidae and Talcporidae. Lists Beutenmüller's manuscript names, *confusellus* at no. 5056 and *quadripunctellus* at no. 5057.)

WALSINGHAM, LORD THOMAS DE GREY

1882. Notes on Tineidae of North America. Trans. Amer. Ent. Soc., vol. 10, pp. 167–170 (Nov.). (Descriptions of *simulatus*, *Eulepiste*, and *cressoni*.)

1884. North American Tortricidae. Trans. Ent. Soc. London, 1884, p. 133 (April). (Descriptions of *Pseudoconchylis* and *laticapitana*.)

1887a. A revision of the genera *Acrolophus*, Poey, and *Anaphora*, Clem. Trans. Ent. Soc. London, 1887, pp. 137–173 (June), pls. 7 and 8. (Descriptions of *Neolophus*, *furcatus*, *maculifer*, *Hypoclopus*, *griseus*, *Ankistrophorus*, *cervinus*, *arizonellus*, *morrisoni*, *propinqua*, *tenuis*, *macrogaster*, *Felderia*, *filicicornis*, *Ortholophus*, *variabilis*, and *Pseudanaphora*.)

1887b. [No title]. Proc. Ent. Soc. London, 1887, p. liv (Nov.). (A note replacing preoccupied generic name, *Ankistrophorus* Walsingham, with new name, *Homonymus* Walsingham.)

1891. On the Micro-Lepidoptera of the West Indies. Proc. Zool. Soc. London, 1891, pp. 511–517, 544–545 (table). (A few miscellaneous references to North American genera and species of Acrolophidae.)

1897. Revision of the West-Indian Micro-Lepidoptera, with descriptions of new species. Proc. Zool. Soc. London, 1897, pp.169–175 (Jan.). (Description of *Atopocera*.)

1907. Descriptions of new North American tineid moths, with a generic table of the family Blastobasidae. Proc. U.S. Nat. Mus., vol. 33, p. 228 (Oct.). (Description of *coloradellus*.)

1915. Tineina of Central America. *In* Biologia Centrali-Americana, Lepidoptera-Heterocera, vol. 4, pt. 12, Family 21, Acrolophidae, pp. 375–401, table 10, figs. 27–31 (Nov. 1914–Jan. 1915). London. (A few miscellaneous references to North American species of Acrolophidae. Contains a large number of bibliographical references covering all the genera of the group.)

ZELLER, P. C.
1873. Beiträge zur Kenntniss der nordamericanischen Nachtfalter, besonders der Microlepidopteren. Verh. Zool.-Bot. Ges. Wien, vol. 23, pp. 214–217 (May). (Descriptions of *scardina* and *bombycina*.)

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